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1990

EPA Superfund
Record of Decision:

NORTH HOLLYWOOD DUMP
EPA ID: TND980558894
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MEMPHIS, TN
09/13/1990

I) RECENT ALLUVIUM WHICH IS COMPRISED OF HETEROGENEOUS ACCUMULATIONS OF CLAY, SILT, SAND AND GRAVEL;

II) LOESS DEPOSITS OF WINDBLOWN SILT;

III) FLUVIAL DEPOSITS WHICH ARE LATERALLY CONTINUOUS AND CONSIDERED TO BE REMNANT TERRACES OF ANCESTRAL GRADED STREAMS;

IV) EOCENE CLAY FORMATIONS CONTAINING MINOR LENSES AND INTERBEDS OF FINE SAND OR LIGNITE;

V) THE MEMPHIS SAND COMPRISED OF A FINE TO COARSE QUARTZ SAND WHICH IS THE PRIMARY WATER SOURCE FOR THE MEMPHIS AREA; AND

VI) THE WILCOX GROUP WHICH CONSISTS OF CLAYS OF THE FLOUR ISLAND FORMATION, SANDS OF THE FORT PILLOW FORMATION, AND CLAYS OF THE OLD BREASTWORKS FORMATION.

THE HYDROGEOLOGIC INVESTIGATIONS CONDUCTED DURING THE ORIGINAL RI AND SUPPLEMENTAL RI CONFIRMED THE INTERPRETATION OF THE REGIONAL GEOLOGY IN THE VICINITY OF THE SITE. THE DATA COLLECTED DURING THE SUPPLEMENTAL RI HYDROGEOLOGIC STUDY IDENTIFIED THAT FOUR MAJOR STRATIGRAPHIC UNITS WERE OF SIGNIFICANCE IN THE IMMEDIATE AREA OF THE SITE. THESE FOUR UNITS INCLUDE:

I) DISPOSED LANDFILL WASTE;
II) UPPER SILT UNIT (LOESS DEPOSITS);
III) FLUVIAL SANDS (ANCESTRAL TERRACE DEPOSITS); AND
IV) LOWER CLAY UNIT (EOCENE CLAY ALSO REFERRED TO AS THE JACKSON FORMATION).

WITHIN THE LANDFILL LIMITS, THE DISPOSED WASTE IS IN DIRECT CONTACT WITH THE FLUVIAL SANDS. FOR THE AREA BEYOND THE LIMITS OF THE LANDFILL, THE UPPER SILT UNIT IS IN DIRECT CONTACT WITH THE FLUVIAL SANDS. THE FLUVIAL SANDS ARE UNDERLAIN BY THE LOWER CLAY UNIT WHICH IS CONTINUOUS IN THE AREA OF THE SITE AND HAS VERY LOW HYDRAULIC CONDUCTIVITY (APPROXIMATELY 3.9 X (10-7) CM/SEC). THE LEVEL OF GROUNDWATER WITHIN THE WASTE, WHERE PRESENT, FLUCTUATES DIRECTLY WITH THE GROUNDWATER LEVELS IN THE FLUVIAL SAND UNIT.

THE HYDRAULIC CONDUCTIVITY IN THE FLUVIAL SAND UNIT WAS CONFIRMED TO BE RELATIVELY UNIFORM ACROSS THE SITE WITH AN AVERAGE VALUE OF APPROXIMATELY 3.75 X (10-2) CM/SEC. THE FLUVIAL SAND UNIT AND THE WOLF RIVER ARE DIRECTLY CONNECTED. THE GROUNDWATER FLOW WITHIN THIS UNIT DISCHARGES COMPLETELY TO THE WOLF RIVER WITH NO COMPONENT OF FLOW BENEATH THE RIVER. DURING PERIODS OF HIGH RIVER LEVELS THE GROUNDWATER FLOW DIRECTION WAS CONFIRMED TO REVERSE WITHIN AN AREA APPROXIMATELY 200 FEET TO 250 FEET BACK FROM THE WOLF RIVER.

THE LOWER CLAY UNIT, WHICH IS DIRECTLY BENEATH THE FLUVIAL SAND UNIT, ACTS AS THE BASE OF THE GROUNDWATER FLOW IN THE FLUVIAL SAND UNIT ON THE BASIS OF THE SHARP HYDRAULIC CONDUCTIVITY CONTRAST BETWEEN THE TWO UNITS. EVALUATION OF THE HYDRAULIC CONDUCTIVITIES MEASURED FROM THE LOWER CLAY UNIT CONFIRMED THAT THIS UNIT WOULD EFFECTIVELY PREVENT THE MIGRATION OF CONTAMINANTS FROM THE FLUVIAL SAND UNIT THROUGH THE LOWER CLAY UNIT TO THE MEMPHIS SANDS. THIS WAS ALSO CONFIRMED THROUGH A STUDY COMPLETED BY GRAHAM AND PARKS (1986) IN THE MEMPHIS AREA. THIS IS SIGNIFICANT SINCE THE MEMPHIS SAND AQUIFER IS THE MAJOR SOURCE OF WATER SUPPLY IN THE MEMPHIS AREA.

THE GROUNDWATER VELOCITY WITHIN THE FLUVIAL SAND UNIT WAS CALCULATED USING A HYDRAULIC GRADIENT OF 0.006 FT/FT, A MEAN HYDRAULIC CONDUCTIVITY OF 3.75 X (10-2) CM/SEC AND AN ASSUMED POROSITY OF 0.35. USING THESE VALUES A VELOCITY OF 6.4 X (10-4) CM/SEC OR 665 FT/YEAR WAS CALCULATED. BASED ON THIS CALCULATION ANY LEACHATE ENTERING THE FLUVIAL SAND UNIT IS EXPECTED TO FLOW TO THE WOLF RIVER IN LESS THAN THREE YEARS.

BASED ON THE LONG TRAVEL TIMES AND THE PROBABLE HIGH ATTENUATION CAPACITY OF THE LOWER CLAY UNIT DUE TO ITS CLAY CONTENT, THE POTENTIAL FOR THE DISPOSED WASTE AT THE NORTH HOLLYWOOD DUMP TO ADVERSELY IMPACT THE MEMPHIS SAND WAS DETERMINED TO BE MINIMAL.

DEMOGRAPHY

THE NORTH HOLLYWOOD DUMP IS LOCATED IN A RESIDENTIAL AREA OF MEMPHIS WITH HOMES ON BELMONT CIRCLE CONTIGUOUS TO THE SITE. THE 1980 CENSUS FOR THE AREA INDICATES A POPULATION OF APPROXIMATELY 2,000 WITHIN A 0.25-MILE RADIUS OF THE SITE, AND A POPULATION OF 5,300 WITHIN A 0.5-MILE RADIUS OF THE SITE.

LAND USE

THE SITE IS LOCATED IN THE NORTHERN PART OF THE CITY OF MEMPHIS, TENNESSEE. THE NORTHERN BOUNDARY OF THE SITE IS BORDERED BY THE WOLF RIVER, A MEANDERING TRIBUTARY OF THE MISSISSIPPI RIVER. OTHER SURFACE WATER BODIES ARE LOCATED IN THE VICINITY OF THE SITE, INCLUDING:

I) AN ABANDONED DREDGE POND;
II) AN OXBOW LAKE (FORMER MEANDER ISOLATED AFTER WOLF RIVER RE-CHANNELIZATION);
III) A BEAVER POND; AND
IV) AN ACTIVE DREDGE POND.

THE ACTIVE DREDGING OPERATION IS LOCATED DIRECTLY ADJACENT TO THE NORTHWEST CORNER OF THE SITE. SANDS AND GRAVELS ARE DREDGED FROM AN OPEN POND FOR USE IN THE CONSTRUCTION INDUSTRY. OTHER AREAS OF FORMER DREDGING ARE LOCATED IN THE VICINITY OF THE SITE, INCLUDING THE ABANDONED DREDGE POND REFERENCED PREVIOUSLY, WHICH HAVE RESULTED IN LARGE OPEN SURFACE WATER BODIES.

THE AREA IMMEDIATELY SOUTH OF THE SITE IS ZONED A DUPLEX RESIDENTIAL DISTRICT WITH ISOLATED AREAS OF MULTIPLE DWELLING ZONING AND LOCAL COMMERCIAL ZONING IN THE AREA. AREAS OF LIGHT AND HEAVY INDUSTRY ARE LOCATED DIRECTLY ADJACENT TO THE RESIDENTIAL AREA. THE MAJORITY OF THE LANDS TO THE EAST, WEST AND NORTH OF THE SITE ARE ZONED FLOODWAY DISTRICT AND ARE ESSENTIALLY UNDEVELOPED.

FIGURE 2 ILLUSTRATES THE LOCAL ZONING IN THE IMMEDIATE VICINITY OF THE NORTH HOLLYWOOD DUMP.

NATURAL RESOURCES

NATURAL RESOURCES FOR THE AREA AROUND NORTH HOLLYWOOD DUMP ARE NOT ABUNDANT AS THE AREA HAS BEEN DEVELOPED WITH A RESIDENTIAL/INDUSTRIAL BASE. HOWEVER, THE ALLUVIAL FLOOD PLAN OF THE WOLF RIVER DOES SUPPORT A COMMERCIAL SAND AND GRAVEL DREDGING OPERATION. THIS IS PROBABLY THE BEST KNOWN NATURAL RESOURCE FOR THE AREA.

TWO VALUABLE BUT LESS THOUGHT OF NATURAL RESOURCES IN THE AREA ARE THE "500-FOOT" AND "1,400-FOOT" GROUNDWATER AQUIFERS. THESE TWO AQUIFERS, BUT PRIMARILY THE 500- FOOT AQUIFER, PROVIDE WATER TO 26 INDUSTRIAL WELLS AND A WELL FIELD FOR RESIDENTIAL WATER SUPPLY COMPRISED OF 26 WELLS WITHIN A THREE-MILE RADIUS OF THE SITE. THESE TWO AQUIFERS DO NOT SHOW EVIDENCE OF BEING ADVERSELY IMPACTED BY THE SITE. SAMPLES COLLECTED FROM THREE PRODUCTION WELLS CONTAINED DETECTABLE CONCENTRATIONS OF THREE ORGANIC CHEMICALS BUT, AS THESE WELLS ARE UPGRADIENT OF THE SITE, IT IS UNLIKELY THAT THE SITE IS THE SOURCE OF THIS CHEMICAL PRESENCE. THE DATA COLLECTED AS PART OF THIS SUPPLEMENTAL RI/FS FURTHER CONFIRMS THIS.

AN ADDITIONAL NATURAL RESOURCE IN THE AREA OF THE SITE IS THE FISH POPULATION FOUND IN THE ABANDONED DREDGE POND AND WOLF RIVER. DATA COLLECTED TO DATE INDICATES THAT THE FISH IN THESE SURFACE WATER BODIES MAY HAVE BEEN IMPACTED BY THE SITE. THESE DATA HAVE RESULTED IN THE BANNING OF FISHING IN THE AREA. EVEN THOUGH FISHING IS OFFICIALLY BANNED, THERE ARE REPORTED CASES OF LOCAL RESIDENTS FISHING IN THESE SURFACE WATER BODIES.

CLIMATOLOGY

WINDS WITHIN THE MEMPHIS AREA ARE GENERALLY SOUTHERLY (49 PERCENT SOUTH, 12 PERCENT SOUTHEAST, 11 PERCENT SOUTHWEST) AND THE AVERAGE GROWING SEASON CLOUD COVER IS LESS THAN THREE-TENTHS ON A TIME BASIS BUT SEVEN-TENTHS DURING THE WETTER WINTER MONTHS. THE ANNUAL MEAN TEMPERATURE FOR THE AREA IS 61.8 DEGREES F) WITH JANUARY BEING THE COLDEST MONTH (MEAN TEMPERATURE OF 39.5 DEGREES F) AND JULY BEING THE WARMEST (MEAN TEMPERATURE OF 82.1 DEGREES F). THE AVERAGE ANNUAL RAINFALL IS 51.6 INCHES WITH THE GREATEST PRECIPITATION GENERALLY OCCURRING DURING WINTER AND EARLY SPRING.

NATURE AND EXTENT OF PROBLEM

WASTE IDENTIFIED ON SITE

THE NORTH HOLLYWOOD DUMP WAS OPERATED AS A MUNICIPAL/INDUSTRIAL LANDFILL BETWEEN THE 1930S AND 1969. NO PRECISE INVENTORY OF THE WASTE HAS BEEN COMPILED BUT THE FOLLOWING ARE TYPICAL OF THE WASTES WHICH WERE DISPOSED OF AT THIS SITE:

I) NEWSPRINT;
II) GLASS;
III) HOUSEHOLD GARBAGE;
IV) WOOD;
V) MISCELLANEOUS METAL WASTES;
VI) METAL DRUMS;
VII) INDUSTRIAL AND CHEMICAL MANUFACTURING WASTES;
VIII) PLASTICS; AND
IX) CONCRETE AND BUILDING RUBBLE.

SURFACE SOIL CONTAMINATION

SURFACE SOIL SAMPLES WERE COLLECTED FROM BETWEEN THE SITE AND THE WOLF RIVER, AND FROM THE NORTH BANK OF THE WOLF RIVER DURING THE SECOND AND FOURTH ROUNDS OF SAMPLING. DURING THE SECOND ROUND OF SAMPLING, SAMPLES WERE OBTAINED FROM SITES AS1-86 THROUGH AS20-86 AS ILLUSTRATED ON FIGURE 3. DURING THE FOURTH ROUND, SAMPLES WERE COLLECTED FROM THESE LOCATIONS AND FROM TEN ADDITIONAL SITES, AS21-86 THROUGH AS30-86, ALSO ILLUSTRATED ON FIGURE 3. ANALYTICAL DATA FOR THE SURFACE SOIL SAMPLES ARE DISCUSSED IN THE FOLLOWING SECTIONS.

THE SURFACE SOIL SAMPLING IDENTIFIED AN AREA OF ELEVATED CONCENTRATIONS ALONG THE EAST SIDE OF THE ABANDONED DREDGE POND (AS13-86 THROUGH AS17-86) AND IN THE LOWLANDS BETWEEN THE SITE CONSTITUENTS IN THE SURFACE SOIL APPEARED TO BE MORE WIDE SPREAD BETWEEN THE EAST SECTOR AND THE WOLF RIVER THAN BETWEEN THE WEST SECTOR AND THE WOLF RIVER.

A SUMMARY OF THE ANALYTICAL DATA FOR THE SURFACE SOIL SAMPLES IS PRESENTED ON TABLES 1 AND 2.

VOLATILE ORGANICS (VOCS)

THE MOST PREVALENT VOCS ENCOUNTERED DURING THE SECOND ROUND OF SAMPLING WERE 2-BUTANONE AND CHLOROFORM. THE FOURTH ROUND SAMPLES CONTAINED ACETONE, VINYL ACETATE AND METHYLENE CHLORIDE AS THE MOST FREQUENTLY OCCURRING VOCS.

IN BOTH SETS OF SOIL SAMPLES, CHLORINATED HYDROCARBONS SUCH AS THE DICHLOROBENZENES WERE FREQUENTLY PRESENT. THESE CHLORINATED HYDROCARBONS WERE DETECTED IN CONCENTRATIONS AS HIGH AS 4,600 UG/KG BUT CONCENTRATIONS LESS THAN 1,000 UG/KG WERE MORE FREQUENT. DURING THE SECOND ROUND THE 6 TO 12-IN SAMPLES FOR AS3-86 AND AS4-86 CONTAINED 1,2-DICHLOROETHANE IN CONCENTRATIONS OF 2,640 UG/KG AND 4,600 UG/KG, RESPECTIVELY. THE 6 TO 12-INCH SAMPLE FROM AS5-86 CONTAINED DIBROMOCHLOROMETHANE AND BROMOFORM IN CONCENTRATIONS OF 1,350 UG/KG AND 2,00 UG/KG, RESPECTIVELY. THE FOURTH ROUND SOIL SAMPLE FROM AS28-86 CONTAINED CARBON TETRACHOLORIDE AND TETRACHLOROETHENE IN CONCENTRATIONS OF 1,050 UG/KG AND 2,370 UG/KG, RESPECTIVELY.

BASE NEUTRAL/ACID EXTRACTABLES (BNA)

ONLY ONE OF THE ROUND 2 SOIL SAMPLES CONTAINED DETECTABLE CONCENTRATIONS OF THE TARGETED BNAS WITH FLUORANTHENE DETECTED IN THE GREATEST CONCENTRATION IN THE 6 TO 12-INCH SAMPLE (8,796 UG/KG). OTHER BNAS DETECTED AND THEIR MAXIMUM CONCENTRATIONS WERE BENZO(A)PYRENE (1,325 UG/KG), NAPHTHALENE (90 UG/KG), ACENAPHTHENE (117 UG/KG), FLUORENE (103 UG/KG), PHENANTHRENE (2,401 UG/KG), PYRENE (1,896 UG/KG) AND BENZO(B&K) PYRENE (2,080 UG/KG).

ROUND 4 SAMPLES WERE ANALYZED FOR THE BNA COMPOUNDS ON THE REVISED INDICATOR PARAMETER LIST. PHTHALATES WERE FREQUENTLY DETECTED WITH BIS (2-ETHYLHEXYL) PHTHALATE THE MOST COMMONLY DETECTED AT CONCENTRATIONS AS HIGH AS (16,300 UG/KG AS12-86).

PESTICIDES

THE RESULTS OF THE PESTICIDE ANALYSES SHOWED LARGE VARIATIONS BETWEEN THE TWO SAMPLING ROUNDS. FOR THE SECOND ROUND 4,4' -DDT WAS THE MOST FREQUENTLY DETECTED PESTICIDE. IN GENERAL, MOST OF THE PESTICIDES WERE DETECTED IN RELATIVELY LOW CONCENTRATIONS. SITES AS16-86 AND AS19-86 WERE THE TWO LOCATIONS WHICH CONTAINED THE GREATEST CONCENTRATIONS OF PESTICIDES. AT AS16-86 CONCENTRATIONS AS HIGH AS 160,000 UG/KG OF CHLORDENE WERE DETECTED AT A DEPTH OF 6 TO 12 INCHES. OTHER PESTICIDES DETECTED AT ELEVATED CONCENTRATIONS WERE CHLORDANE, HEPTACHLOR, AND HEPTACHLORONORBORNENE AND OCTACHLOROCYCLOPENTENE.

THE ROUND 4 ANALYTICAL RESULTS SHOWED FEWER SITES CONTAINING PESTICIDES WITH A MUCH BROADER RANGE OF PESTICIDES DETECTED. SITES AS8-86 AND AS20-86 CONTAINED THE LARGEST CONCENTRATIONS OF PESTICIDES. CHLORDANE, WITH A CONCENTRATION OF 210,000 UG/KG AT AS8-86 AND 17,400 UG/KG AT AS20-86, WAS THE PESTICIDE FOUND IN THE HIGHEST CONCENTRATION DURING THE ROUND 4 SAMPLING.

METALS

METAL CONCENTRATIONS FOR THE TWO ROUNDS OF SOIL SAMPLES WERE GENERALLY CONSISTENT WITH THOSE EXPECTED FOR ALLUVIAL SOILS.

SITE SURFICIAL CAP

TEN SAMPLES OF THE SITE SURFICIAL CAP WERE COLLECTED DURING THE FOURTH ROUND TO CONFIRM THE EFFECTIVENESS OF THE COVER PLACED OVER THE SITE AS PART OF THE 1984 REMEDIATION. THE LOCATIONS OF THESE SAMPLES WERE ILLUSTRATED ON FIGURE 4. ANALYSIS OF COLLECTED SAMPLES INDICATED THAT THE COVER PLACED ON THE WEST SECTOR HAD BEEN GENERALLY EFFECTIVE IN CONTAINING SURFICIAL CONTAMINANTS AT THE SITE. THE COVER OVER THE EAST SECTOR WAS FOUND TO CONTAIN PESTICIDE CONTAMINATION. THESE AREAS OF CONTAMINATION IN MOST CASES OCCURRED AT AREAS THAT HAD EXPERIENCED EROSION PROBLEMS AND SUBSEQUENT CAP REPAIRS.

FEW VOLATILE ORGANICS WERE DETECTED IN THE SURFACE CAP SAMPLES. ACETONE, VINYL ACETATE AND METHYLENE CHLORIDE WERE DETECTED BUT THESE PARAMETERS ARE LABORATORY CONTAMINANTS. TOLUENE WAS THE ONLY OTHER VOC DETECTED AND THIS WAS FOUND ONLY AT SITE CSS1-86.

THE BNAS DETECTED WERE PRIMARILY DIETHYL PHTHALATE, DI-N-OCTYL PHTHALATE AND BIS(2-ETHYLHEXYL) PHTHALATE. BIS (2-ETHYLHEXYL) PHTHALATE WAS FOUND IN CONCENTRATIONS UP TO 37,900 UG/KG AT SITE CSS5-86. HEXACHLOROBENZENE WAS THE ONLY NON-PHTHALATE BNA DETECTED IN THE CAP SAMPLES, DETECTED IN SAMPLE CSS4-86 AT 1,240 UG/KG.

PESTICIDES IN THE CAP SAMPLES WERE PRIMARILY PRESENT ON THE EAST SECTOR. ONLY ONE SAMPLE FROM THE WEST SECTOR CONTAINED ANY PESTICIDES AND THESE CONCENTRATIONS DID NOT EXCEED 90 UG/KG. ALL FIVE CAP SAMPLES FROM THE EAST SECTOR CONTAINED PESTICIDES WITH SITE CSS4-86 CONTAINING THE GREATEST PESTICIDE CONCENTRATION (1,810 UG/KG OF CHLORDANE).

THE CONCENTRATIONS OF METALS IN THE CAP SAMPLES WERE UNIFORM AND WITHIN THE CONCENTRATION RANGE EXPECTED FOR ALLUVIAL SOILS.

TABLE 3 PRESENTS A SUMMARY OF THE CAP SOIL ANALYTICAL DATA. FOR PERSPECTIVE, TABLE 4 PRESENTS A LISTING OF THE CONTENTS OF VARIOUS METALS IN THE LITHOSPHERE AND IN SOILS.

BURIED DRUMS

DURING THE EXCAVATION OF AN ACCESS ROAD FOR THE INSTALLATION OF MONITORING WELL OW14A, B, AN AREA OF BURIED DRUMS WAS UNCOVERED NORTH OF THE WEST SECTOR OF THE COVERED AREA OF THE SITE. THE APPROXIMATE LOCATION OF THE BURIED DRUMS IS SHOWN ON FIGURE 5.

FIVE SAMPLES OF THE DRUM CONTENTS WERE COLLECTED AND ANALYZED FOR THE PRIORITY POLLUTANT LIST. THE SAMPLING AND ANALYSIS OF THE DRUMS WAS NOT CONDUCTED AS PART OF THE SUPPLEMENTAL RI PROGRAM. THE SAMPLING AND QA/QC PROTOCOLS OUTLINED IN THE WORK PLAN WERE NOT FOLLOWED; HOWEVER, APPROVED ANALYTICAL PROCEDURES WERE USED. SINCE MUCH OF THE REQUIRED QA/QC DATA VALIDATION WAS NOT CONDUCTED AND METHOD DETECTION LIMITS WERE NOT PROVIDED, THESE DATA CAN ONLY BE USED FOR QUALITATIVE PURPOSES. THE ANALYTICAL DATA FOR THE DRUM CONTENTS SHOWED MOSTLY LOW LEVEL CONTAMINATION LIKE THAT OF THE REST OF THE LANDFILL WASTE, I.E. SOME METALS, PESTICIDES AND VOCS. THE DRUMS DID CONTAIN HIGH LEVELS OF NICKEL.

GROUNDWATER CONTAMINATION

A TOTAL OF 39 GROUNDWATER MONITORING WELLS WERE SAMPLED FOR SELECTED INDICATOR PARAMETERS DURING THE FOUR SAMPLING EVENTS. OF THE 39 MONITORING WELLS SAMPLED, TEN WERE THE ORIGINAL MONITORING WELLS INSTALLED DURING THE STUDY COMPLETED BY THE TAG AND 29 WERE NEW MONITORING WELLS INSTALLED UNDER THE SUPPLEMENTAL RI. FIGURE 6 ILLUSTRATES THE LOCATION OF ALL MONITORING WELLS. THE SEVEN LEACHATE WELLS WERE DRY DURING THE FOUR ROUNDS OF SAMPLING AND, THEREFORE, WERE NOT SAMPLED.

FOR THE PURPOSE OF DISCUSSING THE GROUNDWATER ANALYTICAL RESULTS, THE MONITORING WELL NETWORK HAS BEEN DIVIDED INTO THREE ZONES, WHICH ARE:

I) MONITORING WELLS UPGRADIENT OF THE SITE;
II) MONITORING WELLS COMPLETED BENEATH AND ADJACENT TO THE DISPOSED WASTE; AND
III) MONITORING WELLS DOWNGRADIENT OF THE SITE.

MONITORING WELLS UPGRADIENT OF SITE

FOURTEEN MONITORING WELLS ARE LOCATED HYDRAULICALLY UPGRADIENT OF THE SITE (FIGURE 6). THESE UPGRADIENT MONITORING WELLS INCLUDE WELLS OW1A, B, C; OW2A, B, C; OW3A, B, C; OW4A, B; TAG 8D; TAG 9S AND TAG 10B.

MONITORING WELL NEST OW1A, B, C, EVEN THOUGH LOCATED HYDRAULICALLY UPGRADIENT OF THE SITE, HAS BEEN SHOWN TO HAVE LEVELS OF CONTAMINATION SLIGHTLY HIGHER THAN THE OTHER BACKGROUND WELLS AND IN THE SAME RANGE AS THE MONITORING WELLS DOWNGRADIENT OF THE SITE. THE REASON FOR THIS CONTAMINATION WAS NEVER DEFINED; THEREFORE, DATA FROM THESE WELLS HAVE BEEN DISREGARDED IN THE FOLLOWING DISCUSSIONS ON THE NEXT SEVERAL PAGES.

THE ANALYTICAL DATA FOR THE REMAINING UPGRADIENT WELLS FORM THE BASIS FOR THE FOLLOWING SUBSECTIONS.

VOLATILE ORGANICS (VOCS)

GROUNDWATER SAMPLES COLLECTED UPGRADIENT OF THE SITE GENERALLY CONTAINED LOW LEVELS OF VOC PARAMETERS WITH AN INCONSISTENT AND IRREGULAR DETECTION PATTERN BETWEEN SAMPLING ROUNDS. VOCS DETECTED DURING THE FOUR ROUNDS OF SAMPLING IN UPGRADIENT GROUNDWATER SAMPLES INCLUDED:

I) ACRYLONITRILE
* ROUND 1 (OW2B; OW3A)
* ROUND 3 (TAG 8D)

II) BENZENE
* ROUND 1 (OW2B)
* ROUND 3 (TAG 8D)

III) 2-BUTANONE
* ROUND 1 (OW3A; OW3C; OW4A; OW4B; TAG 8D; TAG 10B)

IV) 1,2-DICHLOROETHANE
* ROUND 3 (OW2A; OW2B; OW2C; OW3A; OW3B; OW3C; OW4A; OW4B; TAG 8D; TAG 9S; TAG 10B)

V) TETRACHLOROETHENE
* ROUND 4 (OW2B)

VI) TOLUENE
* ROUND 4 (OW2B)

VII) TRICHLOROETHENE
* ROUND 4 (OW3B)

VIII) VINYL ACETATE
* ROUND 4 (TAG 10B)

IX) 1,1-DICHLOROETHENE
* ROUND 3 (TAG 8D)

X) CARBON TETRACHLORIDE
* ROUND 4 (TAG 8D)

BASE NEUTRAL/ACID EXTRACTABLES (BNA)

THE ANALYTICAL DATA FOR THE FOUR ROUNDS OF UPGRADIENT GROUNDWATER SAMPLES INDICATED THAT THE BNA GROUP OF ANALYTES WERE GENERALLY NOT PRESENT IN THE UPGRADIENT GROUNDWATER SAMPLES OR WERE DETECTED AT GENERALLY LOW LEVELS. PHENOLS WERE DETECTED IN ALL SAMPLING ROUNDS EXCEPT ROUND 4. CONCENTRATIONS RANGED FROM A LOW OF 1.66 UG/L (OW4A) DURING THE THIRD ROUND TO A HIGH OF 41.2 UG/L (OW3C) DURING THE SECOND ROUND.

PESTICIDES

ONLY FOUR PESTICIDE COMPOUNDS WERE DETECTED IN MORE THAN ONE ROUND OF SAMPLING OF THE UPGRADIENT GROUNDWATER MONITORING WELLS. THESE COMPOUNDS INCLUDED 4,4' -DDT (TAG 9S); DIELDRIN (OW3C); HEPTACHLOR EPOXIDE (OW3C, TAG 9S); AND CHLORDANE (OW4A, OW3B). OF THESE FOUR COMPOUNDS DETECTED, CHLORDANE WAS THE MOST PREVALENT WITH CONCENTRATIONS RANGING BETWEEN 0.253 UG/L (OW4A; ROUND 2) AND 0.083 UG/L (OW2C; ROUND 2). CHLORDANE WAS NOT DETECTED AT ANY OF THE UPGRADIENT SAMPLING LOCATIONS IN ROUND 3. HEPTACHLOR EPOXIDE WAS IDENTIFIED IN THREE MONITORING WELLS (OW3A, OW3C AND TAG 9S) WITH CONCENTRATIONS RANGING FROM 0.179 UG/L (TAG 9S); ROUND 2) TO 0.02 UG/L (TAG 9S: ROUND 3). DIELDRIN WAS FOUND ONLY AT OW3C IN SAMPLES FROM ROUNDS 2 AND 3 AT CONCENTRATIONS OF 0.251 UG/L AND 0.062 UG/L, RESPECTIVELY. FIVE MONITORING WELLS (OW2C, OW3A, OW4A, OW4B AND TAG 9S) CONTAINED 4-4' DDT AT CONCENTRATIONS FROM 0.168 UG/L (TAG 9S: ROUND 2) TO 0.035 UG/L (OW4B; ROUND 2).

ALL REMAINING PESTICIDES WITH THE EXCEPTION OF HEXACHLORONORBORNADIENE, HEPTACHLOR, ISODRIN AND CHLORDENE, WERE DETECTED ONLY ONCE OR ONLY DURING ONE ROUND OF SAMPLING OF THE UPGRADIENT MONITORING WELLS. THE REMAINING FOUR PESTICIDES INDICATED ABOVE WERE NOT DETECTED IN ANY OF THE UPGRADIENT GROUNDWATER SAMPLES COLLECTED.

METALS

ALL OF THE TARGETED METALS WERE GENERALLY DETECTED AT ANTICIPATED BACKGROUND CONCENTRATIONS WITH THE EXCEPTION OF ALUMINUM (AL) AND ARSENIC (AS). DETECTABLE CONCENTRATIONS RANGED FROM 0.07 TO 50.8 UG/L AL AND FROM 0.002 TO 0.033 UG/L AS. METAL CONCENTRATIONS DETECTED AT EACH MONITORING WELL WERE RELATIVELY CONSISTENT BETWEEN ROUNDS.

MONITORING WELLS WITHIN CONFINES OF THE SITE

ELEVEN OF THE RI MONITORING WELLS ARE SITUATED WITHIN THE PHYSICAL CONFINES OF THE SITE, AND INCLUDE OW5A, B; OW6A, B; OW7; OW8; OW9A, B; OW10; OW11; AND TAG 4S. THESE MONITORING WELLS ARE CONSTRUCTED TO MONITOR GROUNDWATER QUALITY WITHIN THE FLUVIAL SANDS IMMEDIATELY BENEATH THE SITE.

VOLATILE ORGANICS (VOC)

FEW VOCS WERE DETECTED IN THE GROUNDWATER SAMPLES COLLECTED FROM THE MONITORING WELLS SITUATED WITHIN THE CONFINES OF THE SITE. THE VOCS DETECTED WERE GENERALLY AT LOW CONCENTRATIONS AND WITHIN THE SAME RANGE OF CONCENTRATIONS AS IDENTIFIED IN THE BACKGROUND WELLS. THE VOCS DETECTED INCLUDED:

I) CHLOROFORM
* ROUND 3 (OW5A; OW5B; OW6A, OW6B)

II) 1,2-DICHLOROETHANE
* ROUND 3 (OW6A; OW6B; OW8, OW9B; OW10; TAG 4S)

III) CHLOROMETHANE
* ROUND 2 (OW6A; OW6B; OW7)

IV) 2-BUTANONE
* ROUND 1 (OW5A; OW9B)
* ROUND 2 (OW7)

THE FOUR VOCS OUTLINED ABOVE WERE DETECTED IN CONCENTRATIONS LESS THAN 50 UG/L EXCEPT FOR 2-BUTANONE WHICH WAS DETECTED AT A CONCENTRATION OF 500 UG/L DURING THE SECOND SAMPLING ROUND AT OW7.

BASE NEUTRAL/ACID EXTRACTABLES (BNA)

FEW BNA COMPOUNDS WERE DETECTED IN THE GROUNDWATER MONITORING WELLS SITUATED WITHIN THE SITE.

PHENOL WAS DETECTED DURING THE FIRST TWO ROUNDS OF SAMPLING BUT NOT IN SUBSEQUENT SAMPLING ROUNDS. THE CONCENTRATIONS OF PHENOL WERE LOW, RANGING FROM 2 UG/L AT OW7 DURING THE SECOND ROUND TO 7.3 UG/L AT OW5A DURING THE FIRST ROUND.

PHTHALATES WERE NOT INCLUDED IN THE ANALYTICAL PROGRAM FOR THE FIRST TWO SAMPLING ROUNDS BUT WERE INCLUDED FOR ROUNDS 3 AND 4.

PESTICIDES

WITH THE EXCEPTION OF ALPHA ENDOSULFAN, ALL PESTICIDES ANALYZED FOR WERE DETECTED IN AT LEAST ONE OF THE SAMPLING ROUNDS. GENERALLY, PESTICIDES WERE MORE ROUTINELY DETECTED IN SAMPLES FROM THE EAST SECTOR OF THE SITE.

THREE PESTICIDE OR PESTICIDE-RELATED SPECIES WERE DETECTED AT ONE OR MORE MONITORING WELLS WITHIN THE LIMITS OF THE WASTE FOR ALL THREE MONITORING ROUNDS. THESE COMPOUNDS INCLUDED CHLORDENE (TAG 4S), TOTAL BHCS (OW-6A; OW-6B), AND HEPTACHLORONORBORNENE AND OCTACHLOROCYCLOPENTENE (OW6A; TAG 4S).

THREE PESTICIDES WERE EITHER NOT DETECTED AT ALL OR WERE DETECTED ON A MAXIMUM OF ONLY TWO OCCASIONS DURING ALL SAMPLING ROUNDS. THESE COMPOUNDS INCLUDED ALPHA-ENDOSULFAN (NOT DETECTED DURING ANY ROUNDS); DIELDRIN (OW9B; ROUND 2, 0.042 UG/L AND OW7; ROUND 4, 0.63 UG/L); AND HEXACHLORONORBONADIENE (TAG 4S; ROUND 1, 0.089 UG/L).

THE MOST PREVALENT PESTICIDES WERE TOTAL BHCS AND HEPTACHLORONORBORNENE AND OCTACHLOROCYCLOPENTENE. THE OW11, ROUND 2 CONCENTRATION OF 29.1 UG/L FOR TOTAL BHCS WAS THE HIGHEST PESTICIDE CONCENTRATION DETECTED IN THE GROUNDWATER SAMPLES OBTAINED FROM WITHIN THE SITE.

METALS

ALL OF THE TARGETED METALS WERE GENERALLY DETECTED IN THE FOUR ROUNDS OF SAMPLES COLLECTED FROM THE MONITORING WELLS BENEATH THE SITE. AS WITH THE UPGRADIENT WELLS, METAL CONCENTRATIONS WERE CONSISTENT FROM ROUND TO ROUND WITH ALUMINUM AND ARSENIC PRESENT AT ELEVATED CONCENTRATIONS. THE ALUMINUM AND ARSENIC CONCENTRATIONS IN THE MONITORING WELLS WITHIN THE CONFINES OF THE WASTE WERE IDENTIFIED TO BE WITHIN THE SAME RANGE OF CONCENTRATIONS AS THE BACKGROUND MONITORING WELLS. DETECTABLE CONCENTRATIONS RANGED FROM 0.41 TO 39.6 UG/L AL AND 0.002 TO 0.089 UG/L AS.

MONITORING WELLS DOWNGRADIENT OF SITE

TWELVE OF THE MONITORING WELLS UTILIZED FOR THE SUPPLEMENTAL RI WERE LOCATED HYDRAULICALLY DOWNGRADIENT OF THE SITE AND INCLUDE WELLS OW12A, B; OW13; OW14A, B; OW16A, B; OW17; TAG 1D; TAG 2S; TAG 3D; TAG 5S; TAG 6D; AND TAG 7S. TWO ADDITIONAL WELLS, OW16A AND OW16B WERE SITUATED ON THE NORTH SIDE OF THE WOLF RIVER TO DETERMINE IF CONTAMINANT UNDERFLOW OF THE WOLF RIVER HAD OCCURRED. (RESULTS WERE NEGATIVE). THE 12 DOWNGRADIENT WELLS WERE LOCATED TO ASCERTAIN IF CONTAMINANTS WERE MIGRATING FROM THE SITE TOWARD OR INTO THE WOLF RIVER. (RESULTS WERE NEGATIVE).

VOLATILE ORGANICS (VOC)

METHYLENE CHLORIDE AND ACETONE WERE DETECTED IN MOST OF THE GROUNDWATER SAMPLES. THESE PARAMETERS ARE BELIEVED TO BE LABORATORY INTRODUCED CONTAMINANTS.

NINE OTHER VOCS WERE DETECTED INCLUDING:

I) 1,1-DICHLOROETHENE
* ROUND 1 (TAG 1D)

II) TRICHLOROETHENE
* ROUND 1 (TAG 2S)
* ROUND 4 (OW12A, TAG 2S)

III) CHLOROBENZENE
* ROUND 1 (OW14A)
* ROUND 2 (OW14A, TAG 6D)
* ROUND 4 (OW14A, OW14B AND TAG 5S)

IV) 2-BUTANONE
* ROUND 1 (OW17 AND TAG 5S)

V) 1,2-DICHLOROETHANE
* ROUND 3 (OW12A, OW12B, OW13, OW14A, OW14B, OW16A, OW16B, OW17, TAG 1D, TAG 3D, TAG 5S AND TAG 7S)

VI) CHLOROMETHANE
* ROUND 3 (OW14A, OW14B, OW17 AND TAG 5S)

VII) BENZENE
* ROUND 3 (OW16A)

VIII) ACRYLONITRILE
* ROUND 3 (OW14A, OW14B, OW17, TAG 2S AND TAG 5S)

IX) VINYL ACETATE
* ROUND 4 (TAG 7S)

ALL OF THE VOCS DETECTED WERE WITHIN THE SAME RANGE OF CONCENTRATIONS AS THE WELLS WITHIN THE CONFINES OF THE WASTE AND THE BACKGROUND WELLS.

BASE NEUTRALS/ACID EXTRACTABLES (BNA)

THE MONITORING WELL SAMPLES DOWNGRADIENT OF THE SITE, AS IN ALL OTHER MONITORING WELL SAMPLES, CONTAINED PHTHALATES AS THE PRIMARY BNA COMPONENT. PHTHALATES WERE ADDED TO THE INDICATOR PARAMETER LIST FOLLOWING ROUND 2.

THE ROUND ONE SAMPLE COLLECTED FROM MONITORING WELL OW12B CONTAINED DETECTABLE CONCENTRATIONS OF THREE PAH SPECIES, NAMELY BENZO(A)PYRENE (18.6 UG/L), CHRYSENE (17.8 UG/L) AND BENZO(B & K) FLUORANTHENE (5.2 UG/L). THE PAH SPECIES WERE NOT DETECTED DURING ANY OTHER SAMPLING ROUNDS.

OTHER BNA COMPOUNDS DETECTED INCLUDED:

I) NAPHTHALENE
* ROUND 3 (TAG 7S - 3.1 UG/L)
* ROUND 4 (OW13 - 230 UG/L)

II) 2,4-DICHLOROPHENOL
* ROUND 4 (OW13 - 126 UG/L)

III) PHENOL
* ROUND 2 (TAG 1D - 1.7 UG/L)

PESTICIDES

PESTICIDES WERE DETECTED IN GROUNDWATER SAMPLES OBTAINED FROM THE OBSERVATION WELLS LOCATED DOWNGRADIENT OF THE SITE DURING ALL THREE SAMPLING ROUNDS WITH THE MAJORITY OF POSITIVE DETECTIONS OCCURRING DURING THE SECOND ROUND. THE ROUND ONE PESTICIDE ANALYTICAL RESULTS WERE

DEEMED INVALID AND ARE NOT INCLUDED IN THIS DISCUSSION.

PESTICIDES WERE DETECTED IN THE DOWNGRADIENT MONITORING WELLS ON A REGULAR BASIS WITH THE EXCEPTION OF HEXACHLORONORBORNADIENE, (DETECTED ONCE AT TAG 6D DURING ROUND 2); ALPHA ENDOSULFAN (NOT DETECTED DURING ANY ROUND); DIELDRIN (DETECTED ONCE DURING ROUND 2); 4,4' -DDD (DETECTED THREE TIMES DURING ROUND 2); AND ENDRIN (DETECTED FIVE TIMES DURING ROUND 2). GENERALLY, THE DOWNGRADIENT PESTICIDE DATA SHOWED A MARKED INCREASE IN CONCENTRATIONS FROM THE UPGRADIENT DATA. SPECIFICALLY, ISODRIN, HEPTACHLOR EPOXIDE AND CHLORDENE WERE CONSISTENTLY DETECTED AT A HIGHER CONCENTRATION IN THE DOWNGRADIENT THAN IN THE UPGRADIENT WELLS.

METALS

ALL OF THE METALS ANALYZED WERE FOUND IN CONCENTRATIONS SIMILAR TO THOSE PRESENT IN THE UPGRADIENT WELLS. BARIUM SHOWED THE GREATEST DIFFERENCE FROM UPGRADIENT TO DOWNGRADIENT; BUT EVEN THIS INCREASE, COMPARED TO THE MCL OF 1000 UG/L, IS NOT SIGNIFICANT. THE RANGES OF SELECTED METALS ARE PRESENTED BELOW:

DETECTABLE VALUES IN UG/L

METAL	UPGRADIENT RANGE	DOWNGRADIENT RANGE
ALUMINUM	0.07 - 50.8	0.07 - 11.7
COPPER	0.015 - 0.078	0.007 - 0.132
ARSENIC	0.002 - 0.033	0.002 - 0.052
BARIUM	0.028 - 0.686	0.094 - 2.24

SURFACE WATER CONTAMINATION

WOLF RIVER

THE WOLF RIVER, A TRIBUTARY OF THE MISSISSIPPI RIVER, FLOWS PAST THE SITE IN AN EAST TO WEST DIRECTION. IN ORDER TO DETERMINE THE IMPACT THAT THE SITE HAS OR MAY HAVE HAD ON THE WOLF RIVER AND ITS AQUATIC LIFE, RIVER WATER SAMPLES WERE OBTAINED DURING EACH OF THE FOUR SAMPLING ROUNDS AND SAMPLES OF RIVER SEDIMENT WERE COLLECTED DURING ONE SAMPLING ROUND. THE LOCATIONS OF THESE SAMPLING STATIONS ARE ILLUSTRATED IN FIGURE 5.

THE ROUND 1 UPSTREAM WATER SAMPLE CONTAINED NUMEROUS VOCS BUT THEY WERE GENERALLY FOUND IN LOW CONCENTRATIONS. THE VOC DETECTED IN THE HIGHEST CONCENTRATION WAS TOLUENE AT 68.4 UG/L. FEW BNA SPECIES WERE DETECTED IN THE WOLF RIVER WATER SAMPLES. THE MAJORITY OF THE METALS ANALYZED FOR WERE DETECTED IN AT LEAST ONE ROUND OF WOLF RIVER WATER SAMPLES. THERE WAS NO VARIATION IN METALS CONCENTRATIONS FROM UPSTREAM TO DOWNSTREAM OF THE SITE. THIS WOULD INDICATE THAT THE SITE IS NOT A SOURCE OF METAL CONTAMINATION IN THE WOLF RIVER WATER.

TABLES 5 THROUGH 8 PRESENT THE ANALYTICAL DATA FOR THE WOLF RIVER WATER SAMPLES.

DURING THE SECOND ROUND OF SAMPLING, SEDIMENT SAMPLES WERE COLLECTED FROM THE WOLF RIVER AND ANALYZED FOR THE SELECTED INDICATOR PARAMETERS. AS WITH THE WOLF RIVER WATER SAMPLES, SEDIMENT COMPOSITION DOWNSTREAM OF THE SITE WAS NOT SIGNIFICANTLY DIFFERENT FROM THAT UPGRADIENT OR ADJACENT TO THE SITE. A SUMMARY OF THE ANALYTICAL RESULTS FOR THE WOLF RIVER SEDIMENTS SHOWING ONLY THE POSITIVE DETECTIONS IS PRESENTED ON TABLE 9.

FISH CONTAMINATION

STATE OF TENNESSEE FISH STUDY DATA ASSESSMENT

THE STATE OF TENNESSEE CONDUCTED A FISH STUDY ALONG THE WOLF RIVER IN 1981 IN AN ATTEMPT TO DETERMINE WHETHER THE NORTH HOLLYWOOD DUMP HAD IMPACTED THE FISH IN THE WOLF RIVER DIRECTLY ADJACENT TO THE SITE. THE STUDY INCLUDED THE COLLECTION OF VARIOUS FISH TYPES IN THE WOLF RIVER AT A SELECT NUMBER OF LOCATIONS UPSTREAM, DOWNSTREAM AND DIRECTLY ADJACENT TO THE SITE. THE COLLECTED FISH WERE ANALYZED FOR A PREDEFINED PARAMETER LIST WHICH INCLUDED PESTICIDES COMMONLY KNOWN TO EXIST AT THE SITE.

THE ANALYTICAL DATA COLLECTED GENERALLY INDICATED LOW LEVELS OF PESTICIDE CONTAMINATION IN FISH

FLESH, WITH CHLORDANE BEING DETECTED AT LEVELS APPROXIMATELY ONE ORDER OF MAGNITUDE HIGHER THAN THE OTHER PESTICIDES. THE CONCENTRATIONS OF CHLORDANE WERE SLIGHTLY ABOVE THE ACTION LEVEL SET BY THE FOOD AND DRUG ADMINISTRATION. PROBLEMS THAT WERE IDENTIFIED WITH THE DATA INCLUDED:

I) HIGHER CONCENTRATIONS IN FISH UPSTREAM THAN IN FISH DOWNSTREAM OF THE SITE SUGGESTS A POTENTIAL SOURCE OF CONTAMINANTS OTHER THAN THE NORTH HOLLYWOOD DUMP; AND

II) VARIABILITY IN COLLECTED DATA MADE IT DIFFICULT FOR COMPARISON OF DATA BECAUSE OF THE LARGE MIGRATORY POTENTIAL OF FISH.

SUBSEQUENT TO COMPLETION OF THIS STUDY, THE NORTH HOLLYWOOD DUMP WAS REMEDIATED BY PLACING A VEGETATED SOIL COVER OVER THE LIMITS OF SURFICIAL CONTAMINATION. THIS WORK ELIMINATED MOST CONTAMINATED SEDIMENT LOADING TO THE WOLF RIVER.

MSCHD FISH STUDY DATA ASSESSMENT

THE MEMPHIS AND SHELBY COUNTY HEALTH DEPARTMENT (MSCHD) SPONSORED A STUDY TO DETERMINE THE STATUS OF CONTAMINATION IN THE FISH OF THE WOLF RIVER. THE STUDY WAS COMPLETED BY CHRISTIAN BROTHERS COLLEGE AND MEMPHIS STATE UNIVERSITY BETWEEN JUNE AND NOVEMBER 1985. THE STUDY INCLUDED THE COLLECTION OF VARIOUS SPECIES OF FISH IN THE WOLF RIVER FROM THE MISSISSIPPI RIVER TO A POINT APPROXIMATELY 35 MILES UPSTREAM. THE FISH COLLECTED WERE ANALYZED FOR TWELVE PESTICIDE COMPOUNDS.

RESULTS OF THE STUDY SHOWED THAT THE MEAN CONCENTRATION OF PESTICIDES IN THE FISH ALONG THE ENTIRE 35-MILE STRETCH OF THE WOLF RIVER WERE BELOW THE FOOD AND DRUG ADMINISTRATION (FDA) ACTION LEVELS ESTABLISHED FOR PESTICIDES. FOR THE TWELVE PESTICIDES ANALYZED, CHLORDANE WAS MOST REGULARLY DETECTED AND GENERALLY AT THE HIGHEST CONCENTRATION. OF THE 98 FISH SAMPLES COLLECTED ALONG THE 35-MILE STUDY AREA, AND CHEMICALLY ANALYZED, ONLY 17.3 PERCENT CONTAINED CHLORDANE CONCENTRATIONS ABOVE THE FDA ACTION LEVEL.

THE STUDY CONCLUDED THAT CONCENTRATIONS OF PESTICIDES, PARTICULARLY CHLORDANE, IN THE FISH FOUND IN THE WOLF RIVER HAVE DROPPED SINCE 1981 AND IN MOST CASES ARE BELOW THE FDA ACTION LIFE. THE STUDY FURTHER SHOWED THAT THE CONCENTRATIONS IDENTIFIED IN THE FISH ARE WITHIN THE SAME RANGE AS WOULD BE EXPECTED IN OTHER AGRICULTURAL BASED AREAS OF THE SOUTHEAST REGION OF THE UNITED STATES.

SURFACE WATER IMPOUNDMENTS

THE SURFACE WATER IMPOUNDMENTS LOCATED ADJACENT TO THE NORTH HOLLYWOOD DUMP WERE NOT INVESTIGATED AS PART OF THE SUPPLEMENTAL RI. THE ONLY INFORMATION AVAILABLE REGARDING THE NATURE AND EXTENT OF CONTAMINATION OF THESE SURFACE WATER BODIES PREDATES TO THE 1983 TAG STUDIES PRESENTED IN E.C. JORDAN'S DATA INTERPRETATION REPORT (DIR) AND THE STUDIES COMPLETED BY THE PRPS DURING THE DEVELOPMENT STAGE OF THE FINAL SUPPLEMENTAL RI/FS WORK PLAN; CONSEQUENTLY THE FINDINGS OF THESE STUDIES MAY NOT BE REPRESENTATIVE OF PRESENT CONDITIONS.

THE SURFACE WATER IMPOUNDMENTS LOCATED ADJACENT TO THE SITE INCLUDE:

I) THE 40-ACRE ABANDONED DREDGE POND;
II) THE OXBOW LAKE;
III) A BEAVER POND; AND
IV) AN ACTIVE DREDGE POND WEST OF THE SITE

THE PRIMARY CONTAMINANTS IDENTIFIED BY THE DIR IN THE SURFACE WATER IMPOUNDMENTS CONSISTED OF PESTICIDES AND RELATED CHLORINATED COMPOUNDS. PESTICIDES IDENTIFIED IN SURFACE WATERS INCLUDED:

I) OXBOW LAKE - HEPTACHLOR, HEPTACHLOR EPOXIDE, CHLORDENE, 1-HYDROXYCHLORDENE; AND DIELDRIN;
II) BEAVER POND - HEPTACHLOR, HEPTACHLOR EPOXIDE, CHLORDENE, AND 1-HYDROXYCHLORDENE;
III) ABANDONED DREDGE POND - HEPTACHLOR, HEPTACHLOR EPOXIDE, CHLORDENE, ENDRIN KETONE, AND DIELDRIN.

THE DATA USED IN THE DIR ARE PRESENTED ON TABLES 10 THROUGH 13 FOR COMPOUNDS DETECTED IN SURFACE WATERS. THE CONCENTRATIONS OF TOTAL PESTICIDES AND RELATED COMPOUNDS WERE IDENTIFIED TO

GENERALLY BE LESS THAN 1 UG/L. ELEVATED VALUES WERE ATTRIBUTED TO SEDIMENTS WHICH WERE NOT FILTERED FROM THE SAMPLES AND TO THE COLLECTION OF RUNOFF FROM A RESIDUAL SURFICIAL SOIL CONTAMINATION AREA.

PESTICIDES AND RELATED CHLORINATED COMPOUNDS WERE IDENTIFIED IN SEDIMENTS COLLECTED FROM THE SURFACE WATER IMPOUNDMENTS DURING THE TAG STUDY. THE AVAILABLE SEDIMENT ANALYTICAL RESULTS FROM THE TAG STUDY ARE SHOWN ON TABLE 14. CHEMICAL COMPOUNDS WHICH WERE IDENTIFIED IN THE BEAVER POND, OXBOW LAKE, AND ABANDONED DREDGE POND INCLUDE ALDRIN, CHLORDENE, 1-HYDROXYCHLORDENE, GAMMA- CHLORDANE, AND ALPHA-CHLORDANE.

WITHIN THE ABANDONED DREDGE POND, THE DIR REPORTED THAT THE CONCENTRATION OF TOTAL PESTICIDES WERE HIGHEST ADJACENT TO THE LANDFILL, DECREASE IN THE CENTRAL PORTION OF THE POND AND INCREASE AT THE SOUTHEAST END OF THE POND.

IN SEDIMENTS STUDIES COMPLETED BY THE PRPS, THE PESTICIDES WHICH WERE DETECTED IN THE UPPER PORTIONS OF THE SEDIMENT SAMPLES INCLUDED ALDRIN, 4,4-DDD, 4,4'- DDE, 4,4'-DDT, DIELDRIN, ENDOSULFAN-ALPHA, ENDOSULFAN-BETA, ENDOSULFAN SULFATE, ENDRIN, ENDRIN ALDEHYDE, HEPTACHLOR, AND HEPTACHLOR EPOXIDE. PESTICIDES WHICH WERE DETECTED IN THE MIDDLE PORTIONS OF SEDIMENT SAMPLES INCLUDED ALDRIN, 4,4- DDD, ENDOSULFAN-ALPHA, ENDOSULFAN-BETA, ENDRIN, HEPTACHLOR AND HEPTACHLOR EPOXIDE.

HEALTH ASSESSMENT

THE MSCHD WITH ASSISTANCE FROM THE CENTERS FOR DISEASE CONTROL (CDC) CONDUCTED A CROSS-SECTIONAL STUDY OF RESIDENTS OF HOLLYWOOD AND A COMPARISON AREA OF MEMPHIS, TENNESSEE IN 1985 (SOIL PESTICIDE LEVELS FOR A VARIETY OF PESTICIDES WERE HIGHER IN THE HOLLYWOOD AREA THAN IN THE COMPARISON AREA). HOWEVER, ONLY FOR SERUM HEXACHLOROBENZENE AND ADIPOSE TISSUE HEPTACHLOR EPOXIDE WERE THERE INCREASED PESTICIDE LEVELS IN HOLLYWOOD RESIDENTS COMPARED WITH RESIDENTS IN THE COMPARISON AREA. THERE WAS NO EVIDENCE OF INCREASED HEALTH EFFECTS AMONG PERSONS IN THE HOLLYWOOD AREA BASED ON DATA FROM QUESTIONNAIRES, PHYSICAL EXAMINATIONS, AND BLOOD PRESSURE, LIVER ENZYME, AND URINARY PORPHYRIN TESTS. IN SUMMARY, THERE WAS NO EVIDENCE OF INCREASED HEALTH EFFECTS AMONG PERSONS LIVING IN THE HOLLYWOOD AREA THAT COULD BE ATTRIBUTED TO THE HOLLYWOOD DUMP.

#SSR
SUMMARY OF SITE RISKS

A BASELINE RISK ASSESSMENT WAS CONDUCTED FOR THE NORTH HOLLYWOOD DUMP AND IS PRESENTED IN THE RI (SUPPLEMENTAL REPORT) IN THE PUBLIC HEALTH EVALUATION SECTION. THE RISK ASSESSMENT CONSISTED OF HAZARD IDENTIFICATION, A DOSE-RESPONSE EVALUATION, EXPOSURE ASSESSMENT AND RISK CHARACTERIZATION.

SELECTION OF CONTAMINANTS OF CONCERN

THE HAZARD IDENTIFICATION INVOLVED THE SELECTION OF CONTAMINANTS OF CONCERN (COCS), DETECTED CONTAMINANTS WHICH HAVE INHERENT TOXIC/CARCINOGENIC PROPERTIES THAT ARE LIKELY TO POSE THE GREATEST CONCERN WITH RESPECT TO THE PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT. SELECTED CONTAMINANTS OF CONCERN AT NORTH HOLLYWOOD INCLUDED:

INORGANICS	
ARSENIC	COPPER
BARIUM	ZINC
NICKEL	VANADIUM
LEAD	

PESTICIDES	
CHLORDANE	ALDRIN
DIELDRIN	TOTAL BHC
HEPTACHLOR	4,4' DDT
HEPTACHLOR EPOXIDE	ENDRIN

DOSE-RESPONSE EVALUATION

THE DOSE-RESPONSE EVALUATION PRESENTED AVAILABLE HUMAN HEALTH AND ENVIRONMENTAL CRITERIA FOR THE CONTAMINANTS OF CONCERN, AND RELATED THE CHEMICAL EXPOSURE (DOSE) TO EXPECTED ADVERSE HEALTH EFFECTS (RESPONSE). INCLUDED IN THIS ASSESSMENT ARE THE PERTINENT STANDARDS, CRITERIA, ADVISORIES AND GUIDELINES DEVELOPED FOR THE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. AN EXPLANATION OF HOW THESE VALUES WERE DERIVED AND HOW THEY SHOULD BE APPLIED IS PRESENTED BELOW.

CANCER POTENCY FACTOR (CPFS) HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC ASSESSMENT GROUP FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. CPFS, WHICH ARE EXPRESSED IN UNITS OF (MG/KG/DAY)(-1), ARE MULTIPLIED BY THE ESTIMATED INTAKE OF A POTENTIAL CARCINOGEN, IN MG/KG/DAY, TO PROVIDE AN UPPER-BOUND ESTIMATE OF THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT THAT INTAKE LEVEL. THE TERM "UPPER-BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISKS CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CANCER POTENCY FACTORS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION HAS BEEN APPLIED.

REFERENCE DOSES (RFDS) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDS, WHICH ARE EXPRESSED IN UNITS OF MG/KG/DAY, ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS. ESTIMATED INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA (E.G., THE AMOUNT OF A CHEMICAL INGESTED FROM CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDS ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS OF HUMANS). THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDS WILL NOT UNDERESTIMATE THE POTENTIAL FOR ADVERSE NONCARCINOGENIC EFFECTS TO OCCUR.

THE SOURCES FOR STANDARDS CRITERIA AND GUIDELINES USED FOR THIS ASSESSMENT WERE:

I) EPA AMBIENT STANDARDS AND CRITERIA FOR SUPERFUND REMEDIAL SITES. TABLE 5- 2, PAGE 5-9, GUIDANCE ON FEASIBILITY STUDIES UNDER CERCLA. (JUNE 1985)

II) EPA SUPERFUND PUBLIC HEALTH EVALUATION MANUAL (OCTOBER 1986)
* EXHIBIT 4-5, APPLICABLE OR RELEVANT AND APPROPRIATE AMBIENT REQUIREMENTS.
* EXHIBIT 4-6, EPA AMBIENT WATER QUALITY CRITERIA (WQC) FOR PROTECTION OF HUMAN HEALTH
* EXHIBIT 4-7, EPA DRINKING WATER HEALTH ADVISORIES

III) 45FR 79310 NOVEMBER 1980, 49FR 4551 FEBRUARY 1984 52 FR 25690 JULY 1987.

THE STANDARDS, CRITERIA AND GUIDELINES FOR EACH OF THE INDICATORS CHEMICALS IDENTIFIED ARE SUMMARIZED IN TABLE 15. EVALUATION OF THESE CRITERIA INDICATED THAT THE 1/10 96-HOUR LC/50, WHICH IS THE CRITERIA ESTABLISHED BY TENNESSEE UNDER THE TENNESSEE WATER QUALITY CRITERIA IS IN ALL CASES MUCH HIGHER THAN THE FEDERAL NUMBERS.

IN ADDITION TO COMPARING THE EXPOSURE POINT CONCENTRATIONS TO THE CRITERIA PRESENTED IN TABLE 15, TOTAL INCREASED ADDITIVE LIFETIME CANCER RISK WAS ESTIMATED FOR EXPOSURE TO ON-SITE SOILS, EXPOSURE TO SURFACE WATERS BY SWIMMERS AND THE CONSUMPTION OF FISH FROM POTENTIALLY CONTAMINATED SURFACE WATER. IN THE FEDERAL REGISTER PUBLICATION (FR VOL. 52, NO. 130, PAGE 25700) IN WHICH EPA PROMULGATED MCLS FOR CERTAIN VOCS, IT IS STATED THAT "THE TARGET REFERENCE RISK RANGE FOR CARCINOGENS IS (10-4) TO (10-6) AND THE MCLS EPA IS PROMULGATING IN THIS NOTICE GENERALLY FALL IN THIS RANGE. EPA CONSIDERS ADDITIONAL RISK NO GREATER THAN THIS RANGE TO BE PROTECTIVE OF PUBLIC HEALTH. THE TARGET RANGE OF (10-4) TO (10-6) WAS USED IN THIS ASSESSMENT TO EVALUATE THE ACCEPTABILITY OF THE RISKS WHICH WERE ESTIMATED FOR THE RECEPTORS OF COMPLETE PATHWAYS.

THE ESTIMATED HEALTH HAZARD FROM EXPOSURE TO NON-CARCINOGENIC CHEMICALS WAS DETERMINED BY COMPARING THE ESTIMATED EXPOSURE (MG/KG/DAY) WITH THE ACCEPTABLE DAILY INTAKE (ADI), WHICH IS ALSO CALLED ACCEPTABLE INTAKE CHRONIC (AIC). AN EXPOSURE/AIC RATIO EQUAL TO ONE (1) OR GREATER, REPRESENTS A CONCERN FOR PUBLIC HEALTH. AN EXPOSURE/AIC RATIO OF OF LESS THAN ONE (1) IS CONSIDERED PROTECTIVE OF PUBLIC HEALTH. THE "ACCEPTABLE INTAKE CHRONIC" (AIC) IS SIMILAR TO THE CONCEPT OF THE REFERENCE DOSE (RFD) PREVIOUSLY DISCUSSED. IT IS AN ESTIMATE OF AN EXPOSURE LEVEL WHICH WOULD NOT BE EXPECTED TO CAUSE ADVERSE EFFECTS WHEN EXPOSURE OCCURS FOR A LIFETIME.

THE AIC IS ALSO CONSIDERED TO BE ROUTE SPECIFIC.

AIC VALUES ARE GENERALLY DERIVED FROM ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED. AIC VALUES ARE EXPRESSED BOTH IN TERMS OF HUMAN INTAKE (MG/KG/DAY) AND AMBIENT CONCENTRATION (E.G., MG/L FOR DRINKING WATER).

EXPOSURE ASSESSMENT

THE EXPOSURE ASSESSMENT IDENTIFIED POTENTIAL PATHWAYS AND ROUTES FOR CONTAMINANTS OF CONCERN TO REACH THE RECEPTORS AND THE ESTIMATED CONTAMINANT CONCENTRATION AT THE POINTS OF EXPOSURE. CONTAMINANT RELEASE MECHANISMS FROM ENVIRONMENTAL MEDIA, BASED ON RELEVANT HYDROLOGIC AND HYDROGEOLOGIC INFORMATION (FATE AND TRANSPORT, AND OTHER PERTINENT SITE-SPECIFIC INFORMATION, SUCH AS LOCAL LAND AND WATER USE OR DEMOGRAPHIC INFORMATION), WERE ALSO PRESENTED.

AT NORTH HOLLYWOOD DUMP, THE CURRENT RECEPTOR POPULATION WAS IDENTIFIED AS LIMITED TO THE RESIDENTIAL COMMUNITY SURROUNDING THE SITE. POTENTIAL EXPOSURE PATHWAYS EVALUATED INCLUDED THE INGESTION BY OR DIRECT CONTACT WITH SURFACE SOILS, DIRECT CONTACT WITH SURFACE WATERS (SWIMMING), AND THE INGESTION OF FISH. INGESTION OF GROUNDWATER OR INHALATION OF AIRBORNE CONTAMINATIONS OR FUGITIVE DUST WERE NOT IDENTIFIED AS SIGNIFICANT EXPOSURE PATHWAYS.

GROUNDWATER INGESTION WAS NOT CONSIDERED AN EXPOSURE PATHWAY SINCE THE CONTAMINATED SHALLOW GROUNDWATER IS LOCATED DIRECTLY BENEATH THE SITE AND FLOWS DIRECTLY INTO THE WOLF RIVER. THERE ARE CURRENTLY NO DOMESTIC SUPPLY WELLS LOCATED IN THE FLUVIAL SANDS UNIT (SHALLOW AQUIFER) BETWEEN THE SITE AND THE WOLF RIVER. THEREFORE, THERE IS NO CURRENT DIRECT EXPOSURE BY THE PUBLIC TO THE CONTAMINANTS DETECTED IN THE SHALLOW AQUIFER. AN ORDINANCE IN THE CITY OF MEMPHIS (MEMPHIS CHARTER SECTION 424) PREVENTS THE INSTALLATION OF A WATER SUPPLY WELL INTO THE SHALLOW AQUIFER WITHIN CITY LIMITS IF CITY WATER IS AVAILABLE. A GROUNDWATER QUALITY CONTROL BOARD FOR SHELBY COUNTY HAS BEEN ESTABLISHED UNDER ORDINANCE NO. 3736 TO SECURE, PROTECT AND PRESERVE THE QUALITY AND QUANTITY OF THE GROUNDWATER WITHIN SHELBY COUNTY. THIS GOVERNING BODY HAS RESPONSIBILITY FOR ENFORCING THE DEVELOPMENT OF GROUNDWATER USE IN MEMPHIS.

IN ADDITION TO THE ESTABLISHMENT OF THE GROUNDWATER QUALITY CONTROL BOARD, THE MEMPHIS AND SHELBY COUNTY HEALTH DEPARTMENT IS ESTABLISHING REGULATIONS FOR THE CONSTRUCTION AND MODIFICATION OF WATER WELLS IN SHELBY COUNTY. THESE REGULATIONS ARE IN ACCORDANCE WITH THE AUTHORITY GRANTED BY HOUSE BILL NO. 1008; CHAPTER 167; SECTION 17. THESE REGULATIONS REQUIRE THAT ALL WELLS BE CONSTRUCTED AT LEAST TWO FEET ABOVE THE 100-YEAR FLOOD PLAIN. THE AREA BETWEEN THE SITE AND THE WOLF RIVER IS WITHIN THE WOLF RIVER 100-YEAR FLOOD PLAIN. THEREFORE, A DOMESTIC SUPPLY WELL COULD NOT BE LEGALLY INSTALLED BETWEEN THE SITE AND THE WOLF RIVER IN THE FUTURE.

BASED ON THE INSTITUTIONAL CONTROLS IN PLACE, THE SHALLOW AQUIFER BETWEEN THE SITE AND THE WOLF RIVER CANNOT BE USED NOW OR IN THE FUTURE AS A DRINKING WATER SOURCE. THEREFORE, THE USE OF SHALLOW AQUIFER WATER AS A POTABLE WATER SOURCE IS NOT A COMPLETE ROUTE OF EXPOSURE. HOWEVER, CONTAMINATED GROUNDWATER DISCHARGING TO THE WOLF RIVER MAY POTENTIALLY IMPACT THE WATER QUALITY OF THE RIVER. THEREFORE, THE PRINCIPAL EXPOSURE TO THE CONTAMINATED GROUNDWATER IS ADDRESSED UNDER THE DISCUSSION OF THE WOLF RIVER.

INHALATION OF AIRBORNE CONTAMINANTS WAS NOT CONSIDERED A PATHWAY SINCE THE CONTAMINANTS ARE CONTAINED BY A SOIL COVER AND THE MAJOR CONTAMINANTS DO NOT VOLATILIZE READILY.

ASSUMPTIONS USED TO CHARACTERIZE EXPOSURE POINT CONCENTRATIONS WERE ALL BASED ON A 70-KG ADULT.

RISK CHARACTERIZATION

THE RISK CHARACTERIZATION QUANTIFIES PRESENT AND/OR POTENTIAL FUTURE THREATS TO HUMAN HEALTH THAT RESULT FROM EXPOSURE TO THE CONTAMINANTS OF CONCERN AT NORTH HOLLYWOOD. THE SITE-SPECIFIC RISK VALUES ARE ESTIMATED BY INCORPORATING INFORMATION FROM THE HAZARD IDENTIFICATION, DOSE-RESPONSE EVALUATION, AND EXPOSURE ASSESSMENT.

WHEN SUFFICIENT DATA ARE AVAILABLE, A QUANTITATIVE EVALUATION IS MADE OF EITHER THE INCREMENTAL RISK TO THE INDIVIDUAL, RESULTING FROM EXPOSURE TO A CARCINOGEN OR, FOR NONCARCINOGENS, A NUMERICAL INDEX OR RATIO OF THE EXPOSURE DOSE LEVEL TO AN ACCEPTABLE DOES LEVEL IS CALCULATED.

RISKS WHICH WERE ASSESSED IN THE NORTH HOLLYWOOD REMEDIAL INVESTIGATION INCLUDE NONCARCINOGENIC AND CARCINOGENIC RISKS RESULTING FROM EXPOSURE TO INDIVIDUAL COCS.

FOR NONCARCINOGENIC COMPOUNDS, VARIOUS REGULATORY AGENCIES HAVE DEVELOPED STANDARDS, GUIDELINES AND CRITERIA WHICH PROVIDE "ACCEPTABLE" CONTAMINANT LEVELS CONSIDERED TO PROTECT HUMAN POPULATIONS FROM THE POSSIBLE ADVERSE EFFECTS RESULTING FROM CHEMICAL EXPOSURES. A RATIO OF THE ESTIMATED BODY DOSE LEVEL TO THE RFD OR AIC PROVIDES A NUMERICAL INDEX TO SHOW THE TRANSITION BETWEEN ACCEPTABLE AND UNACCEPTABLE EXPOSURE. THIS RATIO IS REFERRED TO AS THE CHRONIC HAZARD INDEX. FOR NONCARCINOGENIC RISKS, THE TERM "SIGNIFICANT" IS USED WHEN THE CHRONIC HAZARD INDEX IS GREATER THAN ONE. WHEN FEDERAL STANDARDS DO NOT EXIST, A COMPARISON WAS MADE TO THE MOST APPLICABLE CRITERIA OR GUIDELINE.

CALCULATED CONTAMINANT DOSE LEVELS, AS DESCRIBED PREVIOUSLY, WERE COMPARED TO THE DOSE LEVEL ASSOCIATED WITH THE MOST APPLICABLE STANDARD OR GUIDELINE. THE ESTIMATED CHRONIC DOSE LEVEL IN UG/KG/DAY IS ESTIMATED USING THE EXPOSURE ASSESSMENT ASSUMPTIONS AND ACTUAL SITE DATA. THE DOSE LEVEL IS THEN COMPARED TO THE AIC TO DETERMINE IF CHRONIC EXPOSURE TO THE CONTAMINATED SOIL PRESENTS A SIGNIFICANT RISK.

FOR CARCINOGENS OR SUSPECTED CARCINOGENS, A QUANTITATIVE RISK ASSESSMENT INVOLVES CALCULATING RISK LEVELS CONSIDERED TO REPRESENT THE PROBABILITY OR RANGE OF PROBABILITIES OF DEVELOPING ADDITIONAL INCIDENCES OF CANCER UNDER THE PRESCRIBED EXPOSURE CONDITIONS. CARCINOGENIC RISK ESTIMATES, EXPRESSED AS ADDITIONAL INCIDENCES OF CANCER, ARE DETERMINED BY MULTIPLYING THE CARCINOGENIC POTENCY FACTOR, AS DESCRIBED EARLIER, BY THE PROJECTED EXPOSURE DOSE LEVEL. THESE RISKS ARE PROBABILITIES THAT ARE GENERALLY EXPRESSED IN SCIENTIFIC NOTATION (E.G., 1 X (10-6)). AN EXCESS LIFETIME CANCER RISK OF 1 X (10-6) INDICATES THAT, AS A PLAUSIBLE UPPER BOUND, AN INDIVIDUAL HAS A ONE IN ONE MILLION CHANCE OF DEVELOPING CANCER AS A RESULT OF SITE-RELATED EXPOSURE TO A CARCINOGEN OVER A 70-YEAR LIFETIME UNDER THE SPECIFIC EXPOSURE CONDITIONS AT A SITE. TO PUT THE CALCULATED RISK ESTIMATES INTO PERSPECTIVE, THEY SHOULD BE EVALUATED AGAINST A BASELINE RISK LEVEL. RISK LEVELS OF (10-4) TO (10-6) CAN BE USED TO DETERMINE THE "ENVIRONMENTAL SIGNIFICANCE" OF THE RISK INCURRED AND ARE USED AS A TARGET RANGE FOR REMEDIAL PURPOSES (US EPA, 1986). USING THIS RANGE AS A BASELINE, A RISK LEVEL GREATER THEN (10-4) IS CONSIDERED TO PRESENT A "SIGNIFICANT" RISK WITH REGARD TO HUMAN HEALTH IN AN ENVIRONMENTAL CONTEXT, AND LEVELS LESS THAN 10-6 ARE CONSIDERED "INSIGNIFICANT." A RISK LEVEL BETWEEN (10-4) AND (10-6) IS CLASSIFIED AS "POTENTIALLY SIGNIFICANT." THE USE OF THE TERMS "SIGNIFICANT", "POTENTIALLY SIGNIFICANT" AND " INSIGNIFICANT" ARE NOT MEANT TO IMPLY ACCEPTABILITY; HOWEVER, THEY HELP TO PUT NUMERICAL RISK ESTIMATES DEVELOPED IN A RISK ASSESSMENT INTO PERSPECTIVE.

THE NONCARCINOGENIC RISK CHARACTERIZATION FOR THE NORTH HOLLYWOOD DUMP CONCLUDED THAT UNDER "REALISTIC WORST-CASE" AND "MOST PROBABLE" EXPOSURE SCENARIOS THE CHRONIC NONCARCINOGENIC RISKS ASSOCIATED WITH CURRENT AND FUTURE EXPOSURES (INGESTION OR DERMAL CONTACT) TO SURFACE SOILS APPEAR TO BE "INSIGNIFICANT." LIKEWISE, ACUTE OR CHRONIC DERMAL CONTACT WITH SURFACE WATER UNDER REALISTIC WORST-CASE AND MOST PROBABLE EXPOSURE SCENARIOS DOES NOT APPEAR TO RESULT IN "SIGNIFICANT" NONCARCINOGENIC RISK.

THE CARCINOGENIC RISK CHARACTERIZATION CONCLUDED THAT THE CARCINOGENIC RISKS ASSOCIATED WITH FUTURE INCIDENTAL INGESTION OF SURFACE SOILS AND DERMAL CONTACT WITH SURFACE SOILS UNDER REALISTIC WORST-CASE AND MOST PROBABLE EXPOSURE SCENARIOS ARE CONSIDERED "INSIGNIFICANT." DIRECT DERMAL CONTACT WITH SURFACE WATERS UNDER FUTURE REALISTIC WORST-CASE AND MOST PROBABLE EXPOSURE SCENARIOS APPEARS TO BE "INSIGNIFICANT" AND FISH CONSUMPTION FROM THE WOLF RIVER ALSO APPEARS TO BE "INSIGNIFICANT." HOWEVER, SCENARIOS WHICH EVALUATE THE CARCINOGENIC HAZARD ASSOCIATED WITH THE INGESTION OF FISH FROM THE ON-SITE PONDS (OXBOW LAKE AND THE DREDGE POND) PREDICT THE CARCINOGENIC RISK TO BE "SIGNIFICANT" (I.E., EXCEEDS THE EPA TARGET RANGE OF (10-4) TO (10-6)) FOR THE REALISTIC WORST-CASE AND "SIGNIFICANT" FOR THE MOST PROBABLE EXPOSURE SCENARIOS. A SUMMARY OF CARCINOGENIC RISKS FOR CONSUMING FISH FROM OXBOW LAKE AND/OR THE DREDGE POND IS PRESENTED IN TABLES 16 AND 17.

ENVIRONMENTAL RISKS

ENVIRONMENTAL RISKS ASSOCIATED WITH THE PRESENCE OF SOIL CONTAMINATION AT NORTH HOLLYWOOD ARE EXPECTED TO BE MINIMAL. BASED ON THE INVESTIGATION RESULTS, SURFICIAL CONTAMINATION IS LIMITED TO RELATIVELY SMALL AREAS OF THE PRESENT COVER THAT HAVE ERODED. THEREFORE, RISKS TO FLORA AND FAUNA AT THE SURFACE ARE LIMITED. ENVIRONMENTAL RISKS FROM THE CONTAMINATED SEDIMENTS IN THE ON-SITE PONDS HAVE ALREADY CONTAMINATED FISH TO ABOVE ACCEPTABLE HUMAN HEALTH LEVELS AND THE

CONTAMINANT HAVE THE POTENTIAL TO BIOACCUMULATE IN OTHER BIOTA. IT SHOULD BE NOTED; HOWEVER, THAT SUBSEQUENT SEDIMENTATION OF THE ON-SITE PONDS COULD HAVE DECREASED THE EXPOSURE TO THE CONTAMINATED SEDIMENTS.

AFFECTS OF THE SHALLOW GROUNDWATER ON THE WOLF RIVER WERE EVALUATED BASED ON STREAM WATER QUALITY STANDARDS SET BY STATE AND FEDERAL CRITERIA. IN ORDER TO EVALUATE WHETHER THE LOW LEVEL CONTAMINATED GROUNDWATER WHICH DISCHARGES TO THE WOLF RIVER RESULTS IN AN EXCEEDENCE OF THE TENNESSEE WATER QUALITY CRITERIA OR THE FEDERAL WATER QUALITY CRITERIA, IT IS NECESSARY TO CALCULATE THE TOTAL CONTAMINANT MASS FLUX INTO THE WOLF RIVER IMMEDIATELY ADJACENT TO THE SITE. UPON DETERMINATION OF THE MASS FLUX TO THE RIVER, A RESULTANT INSTREAM CONCENTRATION CAN BE CALCULATED FOR COMPARISON OF THE INSTREAM WATER QUALITY TO PRE-ESTABLISHED CRITERIA.

THE TOTAL MASS FLUX WAS CALCULATED ACROSS A BOUNDARY FROM UPSTREAM AT A POINT ADJACENT TO THE EASTERN EDGE OF THE LANDFILL TO A POINT DOWNSTREAM ADJACENT TO THE WESTERN EDGE OF THE LANDFILL. THE CONTAMINANTS USED FOR THIS CALCULATION WERE THE INDICATOR CHEMICALS PREVIOUSLY IDENTIFIED.

TABLE 18 PRESENTS THE RESULTS OF MASS FLUX CALCULATIONS FOR EACH INDICATOR CHEMICAL AND FOR EACH ROUND OF SAMPLING INCLUDING AN AVERAGE MASS FLUX FOR ALL ROUNDS. SINCE THE ATTENUATION CAPACITY OF THE CONSTITUENTS WAS NOT CONSIDERED IN THE MASS FLUX CALCULATIONS AND SINCE THE FULL OR PARTIAL LIMIT OF DETECTION WAS USED FOR CONSTITUENTS NOT DETECTED, THE TOTAL MASS FLUX PRESENTED IN TABLE 18 IS CONSERVATIVE. THE ACTUAL MASS FLUX TO THE WOLF RIVER WOULD BE EXPECTED TO BE MUCH LOWER THAN THESE NUMBERS. THE SAMPLING COMPLETED DURING THE SUPPLEMENTAL RI CONFIRMS THIS.

USING THE MASS FLUX CALCULATION PRESENTED IN TABLE 18 THE RESULTANT CONCENTRATION IN THE RIVER WAS CALCULATED TO DETERMINE WHAT IMPACT CONTAMINATED GROUNDWATER DISCHARGE COULD POTENTIALLY HAVE ON THE WOLF RIVER WATER, SEDIMENT QUALITY, AND AQUATIC LIFE. THE RESULTANT CONCENTRATIONS IN THE WOLF RIVER WERE CALCULATED USING TWO FLOW RATES PROVIDED BY THE USGS. THE 3Q20 FLOW RATE WAS USED TO EVALUATE ANY IMMEDIATE OR SHORT-TERM TOXIC EFFECTS TO FISH WHICH COULD POTENTIALLY OCCUR IF CONTAMINATED GROUNDWATER WAS DISCHARGED TO THE WOLF RIVER AT LOW FLOW CONDITIONS. IN ADDITION, ALTHOUGH NOT SPECIFICALLY IDENTIFIED IN THE TENNESSEE WATER QUALITY CRITERIA, THE 15-YEAR AVERAGE FLOW IN THE WOLF RIVER WAS USED TO EVALUATE THE LONG-TERM CHRONIC EFFECTS (OF LIFETIME EXPOSURE) TO HUMANS THAT COULD POTENTIALLY CATCH AND CONSUME FISH FROM THE WOLF RIVER ON A FREQUENT BASIS.

TABLE 19 PRESENTS A SUMMARY OF THE RESULTANT CONCENTRATIONS IN THE WOLF RIVER FOR EACH OF THE INDICATOR CHEMICALS FOR EACH OF THE ASSUMED RIVER FLOW RATES.

THE TENNESSEE WATER QUALITY CRITERIA ESTABLISHED FOR THE FOUR RIVER CLASSIFICATIONS ARE MOST STRINGENT FOR FISH AND AQUATIC LIFE. IN ADDITION TO THESE STATE STANDARDS, FEDERAL WATER QUALITY CRITERIA ARE ALSO ESTABLISHED FOR TOXIC EFFECTS TO AQUATIC LIFE AND CHRONIC EFFECTS TO HUMANS THAT CONSUME AQUATIC LIFE ONLY. ALL THREE OF THESE CRITERIA ARE PRESENTED ON TABLE 19.

THE RESULTANT INRIVER CONCENTRATION FOR ALL OF THE INDICATOR CHEMICALS, WITH THE EXCEPTION OF CHLORDANE FOR THE SECOND ROUND OF DATA, ARE BELOW THE FEDERAL CRITERIA FOR FRESHWATER AQUATIC LIFE FOR BOTH 24-HOUR EXPOSURE AND THE CEILING EXPOSURE. THEREFORE, FOR THE LOW FLOW ("WORST CASE SCENARIO") THERE WILL BE NO SIGNIFICANT IMPACT TO THE FISH FOUND IN THE WOLF RIVER EXCEPT POTENTIALLY FOR CHLORDANE.

EVALUATION OF THE INRIVER CONCENTRATION FOR LONG-TERN CHRONIC EFFECTS IS MORE APPROPRIATELY CARRIED OUT ON THE ANNUAL AVERAGE FLOW OF THE RIVER. THE INRIVER CONCENTRATION FOR THE SUPPLEMENTAL RI SAMPLING ROUNDS FOR THIS FLOW WERE ALL BELOW THE FEDERAL WATER QUALITY CRITERIA FOR THE CONSUMPTION OF FISH ONLY EXCEPT FOR CHLORDANE DURING THE SECOND ROUND OF SAMPLING. GIVEN THE CONSERVATIVE ASSUMPTIONS USED IN THE MASS FLUX CALCULATIONS AND THE CALCULATIONS FOR THE INRIVER CONCENTRATION, IT IS CONCLUDED THAT THE SITE SHOULD NOT SIGNIFICANTLY IMPACT THE WOLF RIVER WATER QUALITY BASED ON PREESTABLISHED REGULATORY HEALTH-BASED CRITERIA.

TO MONITOR THE SHALLOW GROUNDWATER FOR CHANGES IN ITS EFFECTS ON THE RIVER, ALTERNATE CONCENTRATION LIMITS (ACLS) WERE ESTABLISHED USING THE MASS FLUX CALCULATION AND A (10-6) RISK LEVEL FOR THE CONSUMPTION OF FISH FROM THE RIVER. THE ACLS ARE CALCULATED IN TABLE 20. IN ORDER TO DETERMINE IF ANY OF THE ACLS HAVE BEEN EXCEEDED, THE MONITORING WELLS REPRESENTING EACH OF THE CELLS ALONG THE WOLF RIVER WOULD BE SAMPLED AND ANALYZED FOR THE INDICATOR CHEMICALS. THE DATA FROM EACH MONITORING WELL WOULD BE AVERAGED TOGETHER USING A WEIGHING FACTOR BASED ON THE GROUNDWATER FLUX FROM EACH CELL.

GROUNDWATER AND SURFACE WATER SAMPLES WILL INITIALLY BE COLLECTED ON A QUARTERLY BASIS.

1. IF FOUR CONSECUTIVE QUARTERLY SAMPLES SHOW NO EXCEEDANCE OF ESTABLISHED ACLS (WHICH MAY BE MODIFIED UP TO HIGHER BACKGROUND CONCENTRATIONS DETERMINED AS AN AVERAGE OF CONCURRENT RESULTS FROM THE SEVEN UPGRADIENT MONITORING WELLS OW-2A, B, C; OW-3A, B, C; AND TAG 10B), THEN THE MONITORING FREQUENCY MAY BE REDUCED TO A SEMIANNUAL BASIS.

2. IF EIGHT CONSECUTIVE SEMIANNUAL SAMPLES SHOW NO EXCEEDANCE OF ESTABLISHED ACLS, THEN THE MONITORING FREQUENCY MAY BE REDUCED FURTHER TO AN ANNUAL BASIS.

3. IF, AFTER FIVE YEARS OF MONITORING, NO ACL EXCEEDANCE HAS BEEN SHOWN, THEN FURTHER MODIFICATIONS OF THE MONITORING PROGRAM MAY BE CONSIDERED.

4. IF ANY SAMPLE DURING THE MONITORING PERIOD ABOVE SHOWS AN EXCEEDANCE OF A PARAMETER(S) SPECIFIED IN THE ACLS, MONTHLY MONITORING WILL BE INSTITUTED FOR THAT (THOSE) PARAMETERS. THIS MONITORING WILL BE CONDUCTED AT THE TEN DOWNGRADIENT WELLS SPECIFIED FOR THE CALCULATION OF CONTAMINANT FLUX IN GROUNDWATER FROM THE SITE TO WOLF RIVER. QUARTERLY MONITORING WILL BE CONTINUED FOR ALL OTHER PARAMETERS.

A. AFTER TWELVE CONSECUTIVE SAMPLES, A STATISTICAL ANALYSIS USING THE T-DISTRIBUTION WILL BE PERFORMED TO DETERMINE IF A VIOLATION HAS OCCURRED.

B. IF A VIOLATION HAS OCCURRED, APPROPRIATE REMEDIAL ACTION WILL BE BEGUN BY THE PRPS AS SPECIFIED ON PAGE 92 AND MONTHLY MONITORING WILL CONTINUE UNTIL A STATISTICAL ANALYSIS SHOWS A VIOLATION IS NO LONGER OCCURRING.

C. IF A VIOLATION HAS NOT OCCURRED, QUARTERLY MONITORING MAY BE RESUMED AND MONTHLY MONITORING WILL NOT AGAIN BE REQUIRED FOR THAT (THOSE) PARAMETER(S) THAT TRIGGERED THE PREVIOUS SERIES OF MONTHLY MONITORING UNLESS IT (THEY) EXCEEDS THE HIGH VALUE(S) MEASURED DURING THE TWELVE-MONTH MONITORING SEQUENCE.

UNCERTAINTIES

REGARDLESS OF THE TYPE OF RISK ESTIMATE DEVELOPED, IT SHOULD BE EMPHASIZED THAT ALL ESTIMATES OF RISK ARE BASED UPON NUMEROUS ASSUMPTIONS AND UNCERTAINTIES. IN ADDITION TO LIMITATIONS ASSOCIATED WITH SITE-SPECIFIC CHEMICAL DATA, OTHER ASSUMPTIONS AND UNCERTAINTIES THAT AFFECT THE ACCURACY OF THE SITE-SPECIFIC RISK CHARACTERIZATIONS RESULT FROM THE EXTRAPOLATION OF POTENTIAL ADVERSE HUMAN HEALTH EFFECTS FROM ANIMAL STUDIES, THE EXTRAPOLATION OF EFFECTS OBSERVED AT HIGH-DOSE TO LOW-DOSE EFFECTS, THE MODELING OF DOSE RESPONSE EFFECTS, AND ROUTE-TO-ROUTE EXTRAPOLATION.

THE USE OF ACCEPTABLE LEVELS (ESTABLISHED STANDARDS, CRITERIA AND GUIDELINES) AND UNIT CANCER RISK VALUES WHICH ARE DERIVED FROM ANIMAL STUDIES INTRODUCES UNCERTAINTY INTO THE RISK ESTIMATES. IN ADDITION, THE EXPOSURE COEFFICIENTS USED IN ESTIMATING BODY DOSE LEVELS ARE OFTEN SURROUNDED BY UNCERTAINTIES. AS SUCH, THESE ESTIMATES SHOULD NOT STAND ALONE FROM THE VARIOUS ASSUMPTIONS AND UNCERTAINTIES UPON WHICH THEY ARE BASED. IN DEVELOPING NUMERICAL INDICES OF RISK, AN ATTEMPT IS MADE TO EVALUATE THE EFFECT OF THE ASSUMPTIONS AND LIMITATIONS ON THE NUMERICAL ESTIMATES. WHEN THE ASSUMPTIONS AND UNCERTAINTIES OUTWEIGH THE MEANINGFULNESS OF A RISK ASSESSMENT, A QUALITATIVE ASSESSMENT OF THE RISK IS PERFORMED.

THE UNCERTAINTY FACTORS WHICH ARE INCORPORATED INTO THE RISK ESTIMATES ARE BELIEVED TO BE CONSERVATIVE. AS SUCH, WHEN THEY ARE CONSIDERED COLLECTIVELY, EXPOSURE, AND SUBSEQUENTLY RISK, MAY BE OVERESTIMATED. THESE ESTIMATED RISK CALCULATIONS WERE BASED ON PRESENT CONDITIONS AT THE SITE INCLUDING THE TEMPORARY COVER AND NO MAJOR INCREASES OF CONTAMINANTS IN THE SHALLOW AQUIFER WHICH DISCHARGES TO THE WOLF RIVER. ADDITIONAL RISK COULD OCCUR SHOULD THE CONCENTRATION INCREASE OR THE TEMPORARY COVER ERODE.

IN CONCLUSION, BASED ON THE RESULTS OF THE RISK ASSESSMENT, ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM NORTH HOLLYWOOD DUMP, IF NOT ADDRESSED BY IMPLEMENTING THE RESPONSE ACTION SELECTED IN THIS ROD, MAY PRESENT AN ENDANGERMENT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT.

#DOA
DESCRIPTION OF ALTERNATIVES

THE DUMP WASTES, CONTAMINATED SOIL, SURFICIAL GROUNDWATER AND POND SEDIMENTS ARE UNDER CONSIDERATION FOR CLEANUP. THE LANDFILL WASTES AND GROUNDWATER REQUIRE DIFFERENT TECHNOLOGIES FOR REMEDIATION. THE TREATMENT ALTERNATIVES ARE DIVIDED INTO THOSE FOR THE LANDFILL AND GROUNDWATER AND THOSE FOR THE SURFACE WATER IMPOUNDMENTS. A REMEDY FOR THE SITE AND UNDERLYING SURFICIAL GROUNDWATER IS PROPOSED TO PROTECT PUBLIC HEALTH AND THE ENVIRONMENT BY CONTROLLING EXPOSURE TO CONTAMINATED MATERIALS AND CONTROLLING MIGRATION OF CONTAMINANTS INTO SURROUNDING SOILS, SEDIMENTS, AND SURFACE WATER. THE ON-SITE CONTAMINATED WASTES AND SOILS PRESENT RISK LEVELS WHICH ARE WITHIN EPA'S ACCEPTABLE RANGE.

HOWEVER, THE LANDFILL DOES NOT MEET MUNICIPAL LANDFILL STANDARDS FOR THE TIME OF ITS CLOSURE, AND THE TEMPORARY SOIL COVER HAS THE POTENTIAL TO ERODE. IDENTIFIED AS A CLASS II AQUIFER, THE CONTAMINATED SHALLOW GROUNDWATER BENEATH THE SITE IS NOT USED AS A DRINKING WATER SOURCE DUE TO WELL RESTRICTIONS IMPOSED BY SHELBY COUNTY. ALSO, THE SHALLOW GROUNDWATER BENEATH THE SITE DISCHARGES DIRECTLY INTO THE WOLF RIVER. BASED ON THIS INFORMATION, THE SHALLOW GROUNDWATER WAS EVALUATED ON ITS EFFECTS ON THE WOLF RIVER, AND THERE IS PRESENTLY NO INDICATION THAT THE SHALLOW GROUND IS OR WILL IN THE FUTURE PRESENT A RISK TO THE WOLF RIVER. A REMEDY FOR THE IMPOUNDMENT SEDIMENTS IS PROPOSED TO PROTECT PUBLIC HEALTH AND THE ENVIRONMENT BY CONTROLLING THE INGESTION AND ACCUMULATION OF CONTAMINANTS BY FLORA AND FAUNA, ESPECIALLY FISH, IN OXBOW LAKE AND THE DREDGE POND. THE PREFERRED ALTERNATIVES WILL ADDRESS THE DUMP WASTES, CONTAMINATED SOIL, SURFICIAL GROUNDWATER AND POND SEDIMENTS AS ONE RESPONSE ACTION. THE TWO PREFERRED ALTERNATIVES, ONCE IMPLEMENTED, SHOULD COMPLETE THE RESPONSE ACTION AT THIS SITE.

A TOTAL OF FOUR ALTERNATIVES WERE EVALUATED IN DETAIL FOR REMEDIATING THE LANDFILL WASTES AND SHALLOW GROUND WATER. IN ADDITION, SIX ALTERNATIVES WERE EVALUATED IN DETAIL FOR REMEDIATING THE SEDIMENTS IN THE SURFACE WATER IMPOUNDMENTS.

LANDFILL WASTES AND SHALLOW GROUNDWATER

THE FOLLOWING LISTS THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION FOR THE LANDFILL WASTES AND SHALLOW GROUNDWATER.

ALL THESE ALTERNATIVES INVOLVE RESTRICTIONS ON LAND AND WELL USE AT THE SITE, UPKEEP OF THE FENCE AND PROPERTY, AND MONITORING TO ASSESS THE EFFECTIVENESS OF THE REMEDY.

ALTERNATIVE 1: NO ACTION

PRESENT WORTH (PW) COST:	$ 2,338,670
YEARS TO IMPLEMENT:	0

CERCLA REQUIRES THAT THE "NO ACTION" ALTERNATIVE BE CONSIDERED AT EVERY SITE. UNDER THIS ALTERNATIVE, NO SOIL, SEDIMENT, OR GROUNDWATER CONTAINMENT OR TREATMENT WOULD TAKE PLACE. THEYCONTAMINANT LEVELS WOULD OCCUR VIA NATURAL PROCESSES SUCH AS DISPERSION AND ATTENUATION. THE ONLY COSTS WOULD BE FOR MONITORING THE SITE. MONITORING CAN BE IMPLEMENTED USING PREVIOUSLY INSTALLED WELLS.

ALTERNATIVE 2: LOW PERMEABILITY SOIL COVER

PRESENT WORTH COST:	$ 4,942,950
PW CAPITAL COST:	$ 3,364,280
PW O & M COST:	$ 1,578,670
YEARS TO IMPLEMENT:	1

THE EXISTING LOW PERMEABILITY COVER ON-SITE WILL BE UPGRADED TO MEET THE SANITARY LANDFILL STANDARDS OF A TWENTY-FOUR INCH COVER AND THE EXISTING FENCE WILL BE COMPLETED AROUND THE PERIMETER OF THE SITE. EXCAVATION OF THE BURIED WASTES AND CONTAMINATED SOIL IDENTIFIED DURING THE SUPPLEMENTAL RI/FS IN THE MORE EASILY ERODED AREAS NEAR THE WOLF RIVER AND THE SURFACE WATER IMPOUNDMENTS WILL BE PLACED BENEATH THE UPGRADED COVER AS PART OF THIS ALTERNATIVE.

THE COVER WILL CONTAIN AN AREA OF APPROXIMATELY SEVENTY ACRES WITH AN AVERAGE REFUSE LAYER OF 26.5 FEET THICK. EROSION CONTROL MATTING WILL BE PLACED ALONG THE EDGES OF THE LANDFILL IN THE

TEN-YEAR FLOOD PLAN AND EASILY ERODED AREAS. PEGGED SOD WILL BE PLACED ALONG DRAINAGE SWALES AND STEEP SLOPES OF THE LANDFILL. EROSION CONTROL WILL ALSO BE PERFORMED DURING THE CONSTRUCTION AND THE PERIOD AFTER WHILE VEGETATION IS ESTABLISHED OVER THE UPGRADED LANDFILL COVER.

ALTERNATIVE 3: LOW PERMEABILITY SOIL COVER AND HYDRAULIC CONTAINMENT BY EXTRACTION WELLS:

PRESENT WORTH COST:	$ 6,802,680
PW CAPITAL COST:	$ 4,490,420
PW O & M COST	$ 4,312,260
YEAR TO IMPLEMENT:	5

THE SITE WILL BE COVERED AND SPECIFIC AREAS WILL BE EXCAVATED AS DESCRIBED IN ALTERNATIVE 2. ALTERNATIVE 3 ALSO INCLUDES HYDRAULIC CONTAINMENT OF THE SITE BY THE USE OF EXTRACTION WELLS. EXTRACTION WELLS WILL BE PLACE ON SITE AND HYDRAULIC PERFORMANCE MONITORING WELLS WILL BE INSTALLED FOR ASSESSING THE PERFORMANCE OF THE EXTRACTION SYSTEM. THE EXTRACTED GROUNDWATER WILL BE DISCHARGED TO THE CITY OF MEMPHIS SEWER SYSTEM FOR TREATMENT.

ALTERNATIVE 4: LOW PERMEABILITY SOIL COVER AND PHYSICAL CONTAINMENT BY BARRIER WALL

PRESENT WORTH COST:	$ 13,251,555
PW CAPITAL COST:	$ 11,025,685
O & M COST:	$ 2,225,870
YEARS TO IMPLEMENT:	2

ALTERNATIVE 4 WILL CONSIST OF UPGRADING THE EXISTING COVER AND EXCAVATING SPECIFIED AREAS AS DESCRIBED IN ALTERNATIVE 2. ALTERNATIVE 4 WILL ALSO INCLUDE THE CONSTRUCTION OF A BARRIER WALL (CONTAINMENT WALL) INTO THE GROUND AROUND THE PERIMETER TO CONTAIN THE LANDFILL WASTES AND UNDERLYING SHALLOW GROUNDWATER. THE WALL WILL BE INSTALLED USING SLURRY TRENCH TECHNIQUES AND WILL REQUIRE THE CONSTRUCTION OF A COLLECTION DRAIN SYSTEM TO MAINTAIN AN INWARD HYDRAULIC GRADIENT AND CONTROL FLOOD WATERS HIGHER THAN A TEN YEAR FLOOD. EXTRACTION WELLS WILL BE INSTALLED TO REMOVE WATER RESULTING FROM INFILTRATION AND HYDRAULIC PERFORMANCE MONITORING WELLS WILL BE INSTALLED TO MONITOR THE PERFORMANCE OF THE CONTAINMENT SYSTEM.

ARARS

SEVERAL SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) WERE IDENTIFIED FOR THE REMEDIAL ALTERNATIVES OF THE NORTH HOLLYWOOD LANDFILL AND SHALLOW GROUNDWATER.

THE SANITARY LANDFILL STANDARDS SPECIFIED IN THE TENNESSEE SOLID WASTE REGULATIONS ARE AN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENT (ARAR) FOR THE CLOSURE OF NORTH HOLLYWOOD DUE TO IT PRIMARILY BEING AN OLD MUNICIPAL LANDFILL FOR THE CITY OF MEMPHIS. UNDER UIC REGULATIONS, TO LEAVE CONTAMINANTS IN AN AQUIFER ABOVE MCLS IN TENNESSEE (EVEN ONE NOT USED AS A DRINKING WATER SOURCE) AND IN ORDER TO PLACE ADDITIONAL RESTRICTIONS ON WELL INSTALLATION AND USE AT THE SITE, A GROUNDWATER CLASSIFICATION FOR THE SITE AREA MUST BE OBTAINED FROM THE TENNESSEE WATER QUALITY CONTROL BOARD. STATE AND FEDERAL WATER QUALITY CRITERIA ARE ARARS FOR GROUNDWATER DISCHARGES INTO THE WOLF RIVER. THE CRITERIA AND THE ASSOCIATED ALTERNATE CONCENTRATION LIMITS (ACLS) FOR THE GROUNDWATER CONTAMINANT LEVELS ARE LISTED IN TABLE 20 OF THE RISK CHARACTERIZATION SECTION. THE CONSOLIDATION OF WASTE IN THE AREA OF CONTAMINATION (AOC) DOES NOT CONSTITUTE PLACEMENT UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) LAND DISPOSAL RESTRICTION (LDRS), AND THEREFORE LDRS DO NOT APPLY TO THE REMEDIAL ALTERNATIVES. HOWEVER, SHOULD WASTES BE UNEXPECTEDLY UNCOVERED DURING THE WASTE CONSOLIDATION OR MOVEMENT THAT REQUIRE ADDITIONAL CONTAINMENT, TREATMENT, OR REMOVAL, LDRS WILL BE COMPLIED WITH OR TREATABILITY VARIANCES WILL BE OBTAINED. SHOULD IT BECOME NECESSARY TO PUMP AND DISCHARGE GROUNDWATER, CLEAN WATER ACT PRETREATMENT STANDARDS FOR DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWS) WOULD APPLY.

#SWI
SURFACE WATER IMPOUNDMENTS

AS STATED IN THE SUMMARY OF SITE RISKS, SEDIMENT FROM EARLY SAMPLING INDICATES AN UNACCEPTABLE HUMAN RISK LEVEL FROM THE LONG-TERM AND FREQUENT CONSUMPTION OF FISH FROM OXBOW LAKE AND THE DREDGE POND. DUE TO THE CHANGES THAT CAN OCCUR TO THE SEDIMENT IN A SURFACE WATER BODY,

ADDITIONAL SAMPLING WILL TAKE PLACE DURING THE DESIGN PHASE OF THE REMEDY. THIS SAMPLING WILL BE DONE CONCURRENTLY WITH THE DESIGN SO AS NOT TO DELAY THE REMEDIATION PROCESS. THE SAMPLING WILL BE DONE TO VERIFY THE CONDITION OF THE IMPOUNDMENTS AND TO BETTER DEFINE THE CONTAMINATED AREAS. THIS SAMPLING WILL NOT AFFECT THE SELECTED REMEDY UNLESS SURFACE SEDIMENT CONTAMINATION CONCENTRATIONS HAVE DECREASED TO WITHIN ACCEPTABLE RISK LEVELS.

THE FOLLOWING LISTS THE ALTERNATIVES SELECTED FOR REMEDIATION OF THE SURFACE WATER IMPOUNDMENTS.

ALL ALTERNATIVES INVOLVE RESTRICTIONS ON FISHING UNTIL REMEDIATION IS COMPLETE, AND MONITORING IS ESTABLISHED TO ASSESS THE EFFECTIVENESS OF THE REMEDY.

ALTERNATIVE 1: NO ACTION

PRESENT WORTH (PW) COST:	$ 406,500
YEARS TO IMPLEMENT:	0

CERCLA REQUIRES THAT THE "NO ACTION" ALTERNATIVE BE CONSIDERED AT EVERY SITE. UNDER THIS ALTERNATIVE, NO REMEDIATION OF THE IMPOUNDMENTS' SEDIMENT OR FISH WOULD TAKE PLACE. THE ONLY REDUCTION OF CONTAMINANT LEVELS WOULD OCCUR VIA NATURAL PROCESSES, AND ARARS WOULD NOT BE MET. THE ONLY COSTS WOULD BE FOR MONITORING.

ALTERNATIVE 2: PERIODIC HARVESTING OF FISH

PRESENT WORTH COST:	$ 340,910
PW CAPITAL COST:	$ 113,635
PW O & M COST:	$ 227,275
YEARS TO IMPLEMENT:	20

FISH IN THE PONDS WILL BE HARVESTED ON A PERIODIC BASIS TO ENSURE BIOACCUMULATED CONTAMINANT LEVELS IN THE FISH ARE BELOW ACCEPTABLE CONCENTRATION LEVELS SET USING THE (10-6) RISK OF ONE POTENTIAL ADDITIONAL CASE OF CANCER IN A POPULATION OF ONE MILLION PERSONS. FISH WILL BE HARVESTED USING "ROTENONE" OR OTHER APPROPRIATE AGENT. POISONED FISH WILL BE DISPOSED OF IN CONTAINERS PACED WITH SOIL AND SENT TO AN APPROPRIATE LANDFILL. MONITORING OF FISH CONTAMINANT LEVELS WILL BE REQUIRED TO DETERMINE HARVESTING TIMES.

ALTERNATIVE 3: DREDGE WITH CONTAINMENT ON EAST SECTOR OF LANDFILL

PRESENT WORTH COST:	$ 2,341,885
PW CAPITAL COST:	$ 2,298,875
PW O & M:	$ 43,010
YEARS TO IMPLEMENT:	2

ALTERNATIVE 3 CONSISTS OF THE DREDGE/EXCAVATION OF CONTAMINATED SEDIMENTS FROM THE IMPOUNDMENTS AND CONTAINING SEDIMENTS ON THE EAST SECTOR OF THE LANDFILL BENEATH NEW COVER. THE SAMPLING DURING THE REMEDIAL DESIGN (RD) PHASE WILL BE USED TO DETERMINE CONTAMINATED SEDIMENT LEVELS BASED ON A (10-6) RISK LEVEL FOR CONSUMPTION OF THE FISH. THE IMPOUNDMENTS WILL BE DEWATERED DURING THE EXCAVATION PROCESS AND THE FISH WILL BE HARVESTED. THE IMPOUNDMENTS WILL BE RESTOCKED WITH FISH AFTER THE ACTION IS COMPLETE TO KEEP FROM AFFECTING THE WILDLIFE FOOD CHAIN IN THE AREA.

ALTERNATIVE 4: IN-PLACE CONTAINMENT WITH HYDRAULIC FILL

PRESENT WORTH COST:	$ 3,098,940
PW CAPITAL COST:	$ 3,067,300
PW O & M:	$ 31,640
YEARS TO IMPLEMENT:	2

THREE (3) FEET OF FILL WILL BE PLACED OVER THE CONTAMINATED SEDIMENTS TO CONTAIN THE CONTAMINATION. DEPENDING ON RESULTS FROM THE FISH AND SEDIMENT SAMPLING ESTABLISHING ACCEPTABLE SEDIMENT LEVELS, ALL OR PART OF THE APPROXIMATE SEVENTY ACRES OF THE DREDGE POND AND THE APPROXIMATE TEN ACRES OF OXBOW LAKE WILL BE HYDRAULICALLY CONTAINED. GEOFABRIC WILL BE PLACED ON THE SLOPES OF THE DREDGE POND AND ON THE CONTAMINATED AREA OF OXBOW LAKE TO SUSPEND THE MOVEMENT OF CONTAMINANTS AND SEDIMENTS FROM THE SMALL BEAVER POND WILL BE EXCAVATED AND

CONTAINED IN OXBOW LAKE. PARTIAL DEWATERING OF THE IMPOUNDMENTS WILL BE NECESSARY. FISH FROM THE IMPOUNDMENTS WILL BE HARVESTED AND THE IMPOUNDMENTS RESTOCKED UPON COMPLETION OF THE REMEDIAL ACTION (RA).

ALTERNATIVES 5: IN-PLACE CONTAINMENT BY NATURAL DEPOSITION AND REROUTING OF WOLF RIVER

PRESENT WORTH COST:	$ 2,263,130
PW CAPITAL COST:	$ 2,224,700
PW O & M COST:	$ 38,430
YEARS TO IMPLEMENT:	10

ALTERNATIVE 5 CONSISTS OF DIVERTING THE WOLF RIVER THROUGH THE DREDGE POND AND UTILIZING NATURAL SEDIMENTATION TO COVER THE CONTAMINATED SEDIMENTS. INLET AND OUTLET CHANNELS FROM THE WOLF RIVER WILL BE EXCAVATED, AND A DAM WILL BUILT TO CHANNEL WATER FROM THE WOLF RIVER TO FLOW THROUGH THE DREDGE POND. SOIL EXCAVATED FROM THE CHANNELS WOULD BE USED TO BACKFILL OXBOW LAKE. FISH WOULD BE HARVESTED FROM THE DREDGE POND TO PREVENT THEM FROM ENTERING THE WOLF RIVER AND FISH BARRIERS WOULD BE USED TO PREVENT FISH FROM THE WOLF RIVER FROM ENTERING THE DREDGE POND AND COMING IN CONTACT WITH THE SEDIMENTS.

ALTERNATIVE 6: EXCAVATE WITH CONTAINMENT ON EAST SECTOR OF LANDFILL AND IN-PLACE CONTAINMENT WITH HYDRAULIC FILL

PRESENT WORTH COST:	$ 2,988,860
PW CAPITAL COST:	$ 2,945,850
PW O & M COST:	$ 43,010
YEARS TO IMPLEMENT:	2

ALTERNATIVE 6 CONSISTS OF EXCAVATION OF CONTAMINATED SEDIMENTS AT SHALLOW WATER DEPTHS WITH ON-SITE DISPOSAL LIKE ALTERNATIVE 3 AND THE IN-PLACE CONTAINMENT OF CONTAMINATED BOTTOM SEDIMENTS WITH HYDRAULIC FILL LIKE ALTERNATIVE 4. AS IN ALTERNATIVES 3 AND 4, THE FISH WILL BE HARVESTED AND THE IMPOUNDMENTS RESTOCKED AT THE END OF THE REMEDIAL ACTION.

ARARS

ARARS FOR THE SURFACE WATER IMPOUNDMENTS INCLUDE THE FOOD AND DRUG ADMININSTRATION'S (FDA) ACTION LEVELS FOR CONTAMINANTS IN FISH TISSUE. HOWEVER, IT IS ANTICIPATED THAT LEVELS SET ON A (10-6) RISK LEVEL USING THE DATA TAKEN FROM THE FISH SAMPLING THAT WILL BE PERFORMED DURING THE RD WILL BE LOWER THAN THE FDA ACTION LEVELS. IN THE INTEREST OF PUBLIC HEALTH, EPA WILL USE THE FISH CONCENTRATION LEVELS THAT ARE MORE PROTECTIVE IN ESTABLISHING ACCEPTABLE SEDIMENT CONCENTRATION LEVELS AND REMEDIATION REQUIREMENTS FOR THE SURFACE IMPOUNDMENTS.

IN DEWATERING THE IMPOUNDMENTS FOR REMEDIATION, CLEAN WATER ACT STANDARDS FOR DISCHARGES TO POTWS AND THE FILLING OF INLAND SURFACE WATER BODIES UNDER SECTION 404 WILL APPLY.

ANY CONSOLIDATION OF THE CONTAMINATED SEDIMENTS ON SITE WOULD NOT, HOWEVER, BE APPLICABLE UNDER RCRA LDRS SINCE THE CONSOLIDATION IN THE AREA OF CONTAINMENT DOES NOT CONSTITUTE PLACEMENT.

#SCAA
SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THE REMEDIAL ALTERNATIVES DEVELOPED DURING THE NORTH HOLLYWOOD DUMP SITE FS WERE EVALUATED BY US EPA USING THE FOLLOWING NINE CRITERIA. THE ADVANTAGES AND DISADVANTAGES OF EACH ALTERNATIVE WERE THEN COMPARED TO IDENTIFY THE ALTERNATIVE PROVIDING THE BEST BALANCE AMONG THESE NINE CRITERIA.

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT ADDRESSES WHETHER OR NOT AN ALTERNATIVE PROVIDES ADEQUATE PROTECTION AND DESCRIBES HOW RISKS ARE ELIMINATED, REDUCED OR CONTROLLED THROUGH TREATMENT AND ENGINEERING OR INSTITUTIONAL CONTROLS.

2. COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) ADDRESSES WHETHER OR NOT AN ALTERNATIVE WILL MEET ALL OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OR PROVIDE GROUNDS FOR INVOKING A WAIVER.

3. LONG-TERM EFFECTIVENESS AND PERMANENCE REFERS TO THE ABILITY OF AN ALTERNATIVE TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, OVER TIME, ONCE CLEANUP OBJECTIVES HAVE BEEN MET.

4. REDUCTION OF TOXICITY, MOBILITY OR VOLUME IS THE ANTICIPATED PERFORMANCE OF THE TREATMENT TECHNOLOGIES AN ALTERNATIVE MAY EMPLOY.

5. SHORT-TERM EFFECTIVENESS INVOLVES THE PERIOD OF TIME NEEDED TO ACHIEVE PROTECTION AND ANY ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD UNTIL CLEANUP OBJECTIVES ARE ACHIEVED.

6. IMPLEMENTABILITY IS THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF AN ALTERNATIVE, INCLUDING THE AVAILABILITY OF GOODS AND SERVICES NEEDED TO IMPLEMENT THE SOLUTION.

7. COST INCLUDES CAPITAL COSTS, AS WELL AS OPERATION AND MAINTENANCE COSTS.

8. AGENCY ACCEPTANCE INDICATES WHETHER, BASED ON ITS REVIEW OF THE HS/FS AND PROPOSED PLAN, US EPA TNDHE AGREE ON THE PREFERRED ALTERNATIVE.

9. COMMUNITY ACCEPTANCE INDICATES THE PUBLIC SUPPORT OF A GIVEN ALTERNATIVE. THIS CRITERIA IS DISCUSSED IN THE RESPONSIVENESS SUMMARY.

LANDFILL WASTES AND SHALLOW GROUNDWATER

THE FOLLOWING IS THE EVALUATION OF THE FOUR (4) ALTERNATIVES FOR THE LANDFILL WASTES AND GROUNDWATER USING THE NINE CRITERIA. A COMPARISON OF THE ALTERNATIVES OMITTING STATE AND COMMUNITY ACCEPTANCE IS PRESENTED IN TABLE 21.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

ALL ALTERNATIVES PRESENTED IN THIS DOCUMENT EXCEPT FOR NO ACTION WOULD BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT BASED ON PRESENT CONDITIONS. THE NO ACTION ALTERNATIVE IS NOT PROTECTIVE BECAUSE IN THE FUTURE, FAILURE OF THE TEMPORARY COVER ON THE SITE COULD ALLOW HUMAN OR ANIMAL EXPOSURE TO CONTAMINANTS THROUGH SOIL CONTACT AND MIGRATION OF UNACCEPTABLE LEVELS OF CONTAMINANTS INTO THE WOLF RIVER. THE OTHER ALTERNATIVES WOULD PREVENT HUMAN OR ANIMAL EXPOSURE TO ON-SITE CONTAMINANTS AND CONTROL CONTAMINANT CONCENTRATIONS FROM ENTERING THE WOLF RIVER. HOWEVER, SHOULD CONTAMINANT CONCENTRATIONS IN THE GROUNDWATER INCREASE TO ABOVE ACCEPTABLE (10-6) RISK LEVELS, ALTERNATIVES 3 AND 4 WOULD BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

COMPLIANCE WITH APPLICABLE OR THE RELEVANT AND APPROPRIATE REQUIREMENTS

ALL ALTERNATIVES EXCEPT FOR NO ACTION WOULD COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). THE NO ACTION ALTERNATIVE IS NOT IN FULL COMPLIANCE WITH ARARS FOR THE CLOSURE OF LANDFILLS AND WOULD ALLOW FOR POSSIBLE DIRECT CONTACT OR EXPOSURE TO HAZARDOUS SUBSTANCES. ALTERNATIVES 2 THROUGH 4 ARE IN COMPLIANCE WITH SANITARY LANDFILL CLOSURE REQUIREMENTS AND ALTERNATIVES 3 AND 4 ARE IN COMPLIANCE WITH THE ARARS FOR DISCHARGE OF WASTE WATER. ALTERNATIVES 2 THROUGH 4 WILL ALSO COMPLY WITH ALL APPLICABLE RCRA LDRS. VARIANCES IN THE STATE OF TENNESSEE GROUNDWATER STANDARDS UNDER THE UNDERGROUND INJECTION CONTROL (UIC) REGULATIONS WILL BE SOUGHT SO THAT RESTRICTIONS COULD BE PLACED ON GROUNDWATER USE AT THE SITE. SHOULD THE VARIANCES BE DENIED AND A WAIVER NOT BE JUSTIFIED, GROUNDWATER TREATMENT AS SPECIFIED IN ALTERNATIVE 3 COULD BE USED TO MEET APPLICABLE GROUNDWATER STANDARDS.

REDUCTION OF TOXICITY, MOBILITY OR VOLUME

SINCE NONE OF THE REMEDIAL ALTERNATIVES WILL INVOLVE THE TREATMENT OF THE LANDFILLED WASTES, THERE WILL BE NO DIRECT REDUCTION IN THE TOXICITY, MOBILITY, OR VOLUME OF LANDFILL CONTAMINANTS. INDIRECTLY, A REDUCTION IN THE MOBILITY OF LANDFILL CONTAMINANTS WILL OCCUR FOR ALTERNATIVES 2 THROUGH 4 DUE TO THE COVER REDUCING THE AMOUNT OF RAIN WATER FILTERING THROUGH THE WASTES AND ELIMINATING CONTAMINATED SOILS MOVING OFF-SITE FROM EROSION.

ALTERNATIVES 3 AND 4 WILL RESULT IN A SIGNIFICANT REDUCTION OF THE AQUIFER CONTAMINANT MOBILITY, TOXICITY, AND MASS DUE TO THE REMOVAL OF CONTAMINATED SHALLOW GROUNDWATER.

LONG-TERM EFFECTIVENESS

ALL ALTERNATIVES EXCEPT FOR NO ACTION WILL PROVIDE LONG-TERM EFFECTIVENESS AND PERMANENCE. THE TEMPORARY COVER IN PLACE COULD IN THE FUTURE EXPOSE THE PUBLIC AND THE ENVIRONMENT TO THE CONTAMINANTS ON-SITE

SHORT-TERM EFFECTIVENESS

THE DEGREE OF SHORT-TERM EFFECTIVENESS ACHIEVED BY THE ALTERNATIVES WHICH INVOLVE REMEDIAL ACTION IS GREATEST FOR ALTERNATIVE 2. THE LOWEST DEGREE OF SHORT-TERM EFFECTIVENESS IS ACHIEVED BY ALTERNATIVE 4.

THE CONSTRUCTION OF THE LOW PERMEABILITY SOIL LANDFILL COVER IN ALTERNATIVE 2 WILL RESULT IN THE LEAST AMOUNT OF RISK TO THE COMMUNITY, WORKERS AND THE ENVIRONMENT. THE PRIMARY RISKS TO THE COMMUNITY AND WORKERS WILL BE DUE TO AIRBORNE DUST EMISSIONS WHEREAS THE MAIN IMPACT OF THE ENVIRONMENT WILL BE DUE TO POTENTIAL INCREASED SEDIMENT LOADINGS TO THE ADJACENT SURFACE WATERBODIES IN THE SHORT-TERM. THESE RISKS, HOWEVER, ARE READILY CONTROLLED AND MITIGATED. THESE POTENTIAL IMPACTS ARE COMMON TO ALL THREE OF THE ALTERNATIVES WHICH INVOLVE UPGRADING THE EXISTING COVER.

ALTERNATIVE 3 WILL INCREASE THE POTENTIAL RISK TO WORKERS DUE TO THE INCREASED CONTACT WITH CONTAMINATED MEDIA. HOWEVER, THIS RISK TO THE WORKER IS READILY ADDRESSED BY ENFORCING AN APPROPRIATE HEALTH AND SAFETY PROGRAM DURING CONSTRUCTION. ALTERNATIVE 4 WILL PRESENT POTENTIAL RISKS TO THE WORKERS AND COMMUNITY WHICH WILL BE MORE DIFFICULT TO ADDRESS. THE CONSTRUCTION OF THE CONTAINMENT WALL IN ALTERNATIVE 4 WILL LIKELY ENCOUNTER LANDFILLED WASTES ALONG THE LANDFILL PERIMETER. CONSEQUENTLY, THE IMPLEMENTATION OF THIS ALTERNATIVE WOULD PRESENT A GREATER RISK TO WORKERS AND THE COMMUNITY THAN FOR THE OTHER REMEDIAL ALTERNATIVES DUE TO THE POTENTIAL FOR SERIOUS SITE INCIDENTS TO OCCUR.

IMPLEMENTABILITY

THE IMPLEMENTABILITY OF AN ALTERNATIVE IS BASED ON TECHNICAL FEASIBILITY, ADMINISTRATIVE FEASIBILITY AND AVAILABILITY OF SERVICES AND MATERIALS. THE CONSTRUCTION AND MATERIALS OF THE UPGRADED LOW PERMEABILITY SOIL LANDFILL COVER FOR ALTERNATIVES 2 THROUGH 4 UTILIZES STANDARD CONSTRUCTION TECHNIQUES AND CAN BE COMPLETED WITHIN A SINGLE CONSTRUCTION SEASON. CONSEQUENTLY, THE IMPLEMENTATION OF THIS COMPONENT OF THESE REMEDIAL ALTERNATIVES WILL NOT BE OF CONCERN.

THE PRIMARY DIFFICULTY WHICH IS ANTICIPATED FOR ALTERNATIVE 3 IS THE INHERENT PROBLEM IN EVALUATING THE HYDRAULIC PERFORMANCE OF THE SYSTEM DUE TO THE HYDRAULIC CHARACTERISTIC OF THE SHALLOW AQUIFER AND THE PROXIMITY OF THE WOLF RIVER. BY COMPARISON, THE IMPLEMENTATION OF ALTERNATIVE 4 IS ANTICIPATED TO ENCOUNTER NUMEROUS DIFFICULTIES. THE CONSTRUCTABILITY OF THE CONTAINMENT WALL IS THE MAJOR IMPLEMENTABILITY CONCERN. DUE TO GEOLOGIC CONDITIONS AT THE SITE, THE INTEGRITY OF A CONSTRUCTED CONTAINMENT WALL WILL BE QUESTIONABLE. IN ADDITION, THE EXISTING TOPOGRAPHY IS NOT WELL-SUITED TO THE CONSTRUCTION OF A CONTAINMENT WALL. OTHER IMPLEMENTABILITY CONCERNS INCLUDE THE ANTICIPATED INTERFERENCE OF ADJACENT STRUCTURES, THE STABILITY OF LANDFILL SLOPES, AND THE AVAILABILITY OF SUITABLE CLAY BACKFILL.

COST

THE PRESENT WORTH COST ASSOCIATED WITH ALTERNATIVE 1 IS $2,338,670. THE ESTIMATED PRESENT WORTH COST OF ALTERNATIVE 2 IS $4,942,950. ALTERNATIVE 3 IS $6,778,620, AND ALTERNATIVE 4 IS $13,251,555. THE PRESENT WORTH VALUE REPRESENTS THE TOTAL COST OF THE REMEDIATION EXPRESSED IN TODAY'S DOLLARS.

ALTERNATIVES 3 AND 4 ARE NOT COST EFFECTIVE FOR PRESENT SITE CONDITIONS SINCE CONTAMINANT CONCENTRATIONS IN THE GROUNDWATER ARE NOT ABOVE ACCEPTABLE RISK LEVELS, AND THEREFORE, DO NOT PROVIDE AN ADDED DEGREE OF PROTECTION.

STATE ACCEPTANCE

THE STATE OF TENNESSEE HAS ASSISTED EPA IN THE REVIEW OF REPORTS AND SITE EVALUATIONS. THE STATE HAS REVIEWED AND CONDITIONALLY CONCUR WITH THE SELECTED REMEDY FOR THE LANDFILL WASTES AND GROUNDWATER AS LONG AS THE GROUNDWATER VARIANCE IS RECEIVED FROM THE TENNESSEE WATER QUALITY

BOARD (SEE APPENDIX B).

COMMUNITY ACCEPTANCE

COMMUNITY RESPONSE TO THE ALTERNATIVES IS PRESENTED IN THE RESPONSIVENESS SUMMARY WHICH ADDRESSES COMMENTS RECEIVED DURING THE PUBLIC MEETING AND PUBLIC COMMENT PERIOD. ALTHOUGH THE PUBLIC HAD GENERAL QUESTIONS CONCERNING THE REMEDY, NO COMMENTS WERE RECEIVED THAT INDICATED THE NEED FOR A MAJOR CHANGE IN THE REMEDY SELECTED.

SURFACE WATER IMPOUNDMENTS

THE FOLLOWING IS THE EVALUATION OF THE SIX (6) ALTERNATIVES FOR THE SURFACE WATER IMPOUNDMENTS USING THE NINE CRITERIA. A COMPARISON OF THE ALTERNATIVES OMITTING STATE AND COMMUNITY ACCEPTANCE IS PRESENTED IN TABLE 22.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

ALL THE ALTERNATIVES PRESENTED IN THIS DOCUMENT EXCEPT FOR NO ACTION WOULD BE PROTECTIVE OF HUMAN HEALTH; HOWEVER, ALTERNATIVE 2 DOES NOT PROVIDE A DEGREE OF PROTECTION TO THE ENVIRONMENT. THE NO ACTION ALTERNATIVE IS NOT PROTECTIVE BECAUSE IT ALLOWS BIOACCUMULATION OF CONTAMINANTS BY WILDLIFE IN THE IMPOUNDMENT AND THE POSSIBLE HUMAN INGESTION OF CONTAMINATED FISH. ALTERNATIVE 2 DOES NOT PREVENT BIOACCUMULATION IN THE WILDLIFE POPULATION. ALTERNATIVE 3 THROUGH 6 PREVENT THE BIOTA IN THE IMPOUNDMENT FROM COMING IN CONTACT WITH OR INGESTING CONTAMINATED SEDIMENTS.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

ALL ALTERNATIVES EXCEPT FOR NO ACTION AND ALTERNATIVE 5 WOULD COMPLY WITH ARARS. THE NO ACTION ALTERNATIVE WOULD ALLOW THE LEVELS OF CONTAMINANTS IN THE EDIBLE PORTIONS OF FISH TO REMAIN ABOVE HEALTH RISK LEVELS. ALTERNATIVE 5 WOULD NOT COMPLY WITH THE US ARMY CORPS OF ENGINEERS REGULATORY PROGRAM REQUIREMENTS. THE OTHER ALTERNATIVES WOULD RETURN FISH CONTAMINATION LEVELS TO BELOW ACCEPTABLE STANDARD AND WOULD MEET APPLICABLE RCRA LDRS, SURFACE WATER QUALITY STANDARDS, CLOSURE REGULATIONS, AND EFFLUENT DISCHARGE REQUIREMENTS.

REDUCTION OF TOXICITY, MOBILITY OR VOLUME

SINCE NONE OF THE REMEDIAL ALTERNATIVES WILL INVOLVE THE TREATMENT OF THE CONTAMINATED SEDIMENTS, THERE WILL BE NO REDUCTION IN THE TOXICITY, OR VOLUME OF CONTAMINANTS ASSOCIATED WITH BOTTOM SEDIMENTS.

DUE TO THE REMOVAL AND SECUREMENT OF THE BOTTOM SEDIMENTS, ALTERNATIVE 3, 5, AND 6 WILL RESULT IN A SIGNIFICANT REDUCTION IN ENVIRONMENTAL MOBILITY AND MASS OF CONTAMINANTS IN THE AQUATIC ENVIRONMENT, BUT NOT FOR THE WHOLE SITE SINCE THE SEDIMENTS WILL BE PLACED IN THE LANDFILL. ALTERNATIVES 4, 5, AND 6 WILL RESULT IN A SIGNIFICANT REDUCTION IN ENVIRONMENTAL MOBILITY DUE TO THE ISOLATION OF CONTAMINATED SEDIMENTS BELOW A LAYER OF CLEAN FILL.

LONG-TERM EFFECTIVENESS

ALL OF THE ALTERNATIVES EXCEPT NO ACTION WOULD PROVIDE LONG-TERM EFFECTIVENESS; HOWEVER, THERE IS NO PERMANENCE ASSOCIATED WITH ALTERNATIVE 2. ONCE THE CONTAMINATED SEDIMENTS ARE NO LONGER ACCESSIBLE TO THE IMPOUNDMENTS' BIOTA FOR ACCUMULATION, FISH TISSUE CONCENTRATIONS WILL START DECREASING AND RETURN TO ACCEPTABLE LEVELS.

SHORT-TERM EFFECTIVENESS

ALL OF THE REMEDIES EXCEPT NO ACTION WILL REMOVE CONTAMINATED FISH FROM THE IMPOUNDMENTS DURING THE REMEDIAL ACTION EFFECTIVELY REDUCING SHORT-TERM EXPOSURE TO CONTAMINATED FISH. PRIOR TO THE ACTION, THE COMMUNITY WILL BE PROTECTED FROM SHORT-TERM RISK FROM FISH CONSUMPTION THROUGH INSTITUTIONAL CONTROLS WARNING PERSONS OF FISHING HAZARDS. SHORT-TERM HUMAN EXPOSURE THROUGH CONTACT WITH CONTAMINATED SEDIMENTS DURING THE REMEDIATION WILL BE CONTROLLED THROUGH HEALTH AND SAFETY PROCEDURES.

THE PRIMARY DIFFERENCES BETWEEN THE ALTERNATIVES ARE THE EXTENT OF THE POTENTIAL ENVIRONMENTAL IMPACT RELATED TO IMPLEMENTATION. ALTERNATIVE 4 DOES NOT REQUIRE THE HANDLING OF CONTAMINATED

SEDIMENTS WHEREAS THE OTHER ALTERNATIVES INVOLVE DREDGE/EXCAVATION ACTIVITIES WHICH MAY POTENTIALLY IMPACT WORKERS AND THE COMMUNITY. CONSEQUENTLY, THIS ALTERNATIVE IS CONSIDERED TO HAVE A GREATER DEGREE OF SHORT-TERM EFFECTIVENESS. THE POTENTIAL FOR SHORT-TERM IMPACT ASSOCIATED WITH ALTERNATIVE 3 IS DEEMED TO BE MARGINALLY GREATER THAN THE POTENTIAL FOR IMPACTS ASSOCIATED WITH THE IMPLEMENTATION OF ALTERNATIVE 6. THIS DIFFERENCE IS PRIMARILY DUE TO THE NATURE OF THE WORK AND RECOGNIZES THAT DREDGING IS LESS READILY CONTROLLED THAN MECHANICAL EXCAVATION AND THAT THERE ARE HAZARDS TO THE COMMUNITY AND THE ENVIRONMENT WHICH ARE INHERENT TO THE OPERATION OF LIQUID IMPOUNDMENTS. ALTERNATIVE 5 IS DEEMED TO BE THE LEAST EFFECTIVE OF THE ALTERNATIVES IN THE SHORT-TERM DUE TO THE POTENTIAL IMPACTS TO THE WOLF RIVER AND ADJOINING FLOODPLAIN. THE POTENTIAL IMPACTS FROM THE IMPLEMENTATION OF THIS ALTERNATIVE ARE NOT LIMITED TO THE IMMEDIATE AREA OF THE IMPOUNDMENTS.

IMPLEMENTABILITY

THE IMPLEMENTABILITY OF AN ALTERNATIVE IS BASED ON TECHNICAL FEASIBILITY, ADMINISTRATIVE FEASIBILITY AND THE AVAILABILITY OF SERVICES AND MATERIALS.

THERE ARE NO MAJOR CONCERNS REGARDING THE IMPLEMENTABILITY OF ALTERNATIVES 2 AND 4. ALTERNATIVES 3 AND 6, HOWEVER, ARE CONSIDERED DIFFICULT TO IMPLEMENT DUE TO THE DEGREE OF DEWATERING OF THE ABANDONED DREDGE POND WHICH IS REQUIRED. IN ADDITION, THE IMPLEMENTATION OF ALTERNATIVE 3 WILL BE LIMITED BY THE SIZE OF THE DREDGE POND, THE ABILITY TO ACCOMMODATE SIGNIFICANT CHANGES IN THE VOLUME OF MATERIAL TO BE HANDLED, AND THE REQUIRED LENGTH OF THE CONSTRUCTION PERIOD. ALTERNATIVE 3 ALSO REQUIRES THE WET HANDLING OF CONTAMINATED SEDIMENTS WHICH MAY BE DIFFICULT. THE TECHNICAL FEASIBILITY OF SETTLING OUT DREDGED SEDIMENTS WITHOUT THE USE OF FLOCCULANTS IS UNCERTAIN. THIS FACTOR WILL POTENTIALLY HAVE A SIGNIFICANT IMPACT ON THE IMPLEMENTABILITY OF THIS ALTERNATIVE.

CONSEQUENTLY, ALTERNATIVE 3 IS CONSIDERED TO BE THE MOST DIFFICULT TO IMPLEMENT AND THE MOST SENSITIVE TO POTENTIAL IMPLEMENTATION PROBLEMS.

THE IMPLEMENTABILITY OF ALTERNATIVE 5 IS ANTICIPATED TO BE LIMITED BY ADMINISTRATIVE AND ENVIRONMENTAL CONCERNS. DUE TO THE POTENTIAL ENVIRONMENTAL IMPACT OF THIS ALTERNATIVE, IT IS ANTICIPATED THAT THE IMPLEMENTATION OF THIS ALTERNATIVE WILL BE DELAYED SIGNIFICANTLY.

COST

THE PRESENT WORTH COST OF ALTERNATIVE 1 IS $406,500. ALTERNATIVE 2 HAS AN ESTIMATED PRESENT WORTH COST OF $340,910 INCLUDING OPERATIONS AND MAINTENANCE (O&M) COSTS. THE ESTIMATED PRESENT WORTH OF ALTERNATIVE 3 IS $2,341,885, ALTERNATIVE 4 IS $3,098,940, ALTERNATIVE 5 IS $2,263,130 AND ALTERNATIVE 6 IS $2,988,860.

THE INDIRECT CAPITAL COSTS FOR SEVERAL OF THESE ALTERNATIVES, HOWEVER, ARE HIGHLY SENSITIVE TO CHANGES IN THE VOLUME OF CONTAMINATED SEDIMENTS TO BE HANDLED. ALTERNATIVE 3 IS THE MOST SENSITIVE TO VOLUME CHANGES WHEREAS ALTERNATIVE 4 IS THE LEAST SENSITIVE. DUE TO THE REQUIRED PARTIAL EXCAVATION OF CONTAMINATED SEDIMENTS TO BE HANDLED, THE INDIRECT CAPITAL COSTS FOR ALTERNATIVES 5 AND 6 ARE MODERATELY SENSITIVE. CONSEQUENTLY, THE INDIRECT CAPITAL COSTS ASSOCIATED WITH ALTERNATIVES 3, 5, AND 6 COULD VARY SIGNIFICANTLY ONCE THE LATERAL AND VERTICAL EXTENT OF SEDIMENTS TO BE REMOVED IS REFINED BY THE RESULTS FROM THE PRECONSTRUCTION SEDIMENT SAMPLING PROGRAM.

STATE ACCEPTANCE

THE STATE OF TENNESSEE HAS ASSISTED EPA IN THE REVIEW OF REPORTS AND SITE EVALUATIONS. THE STATE HAS REVIEWED AND CONCURS WITH THE SELECTED REMEDY FOR THE IMPOUNDMENTS (SEE APPENDIX B).

COMMUNITY ACCEPTANCE

COMMUNITY RESPONSE TO THE ALTERNATIVES IS PRESENTED IN THE RESPONSIVENESS SUMMARY WHICH ADDRESSES COMMENTS RECEIVED DURING THE PUBLIC MEETING AND PUBLIC COMMENT PERIOD. ALTHOUGH THE PUBLIC HAD GENERAL QUESTIONS CONCERNING THE REMEDY, NO COMMENTS WERE RECEIVED THAT INDICATED THE NEED FOR A MAJOR CHANGE IN THE REMEDY SELECTED.

#SR
SELECTED REMEDIES

LANDFILL WASTES AND SHALLOW GROUNDWATER

THE SELECTED REMEDY FOR THE LANDFILL WASTES AND SHALLOW GROUNDWATER IS ALTERNATIVE 2 INVOLVING THE CONTAINMENT OF THE WASTES USING A LOW PERMEABILITY SANITARY LANDFILL COVER AND SECURING THE SITE BY COMPLETING THE PERIMETER FENCE.

THE SELECTED REMEDY WILL INCLUDE THE FOLLOWING ACTIVITIES:

I) DISCING THE EXISTING 70-ACRE LANDFILL SURFACE;

II) PROOF ROLLING THE ENTIRE 70-ACRE LANDFILL SURFACE;

III) EXCAVATING THE BURIED DRUMS NORTH OF THE WEST SECTOR, CHARACTERIZING DRUM CONTENTS AND CONSOLIDATING ALL SOLID CONTENTS ON THE SURFACE OF THE WEST SECTOR BENEATH THE FINAL COVER. ALL LIQUID WASTES FOUND WILL BE DISPOSED OF OFF-SITE IN ACCORDANCE WITH FEDERAL AND STATE STANDARDS. SHOULD CONTAMINANT LEVELS IN THE SOLID CONTENTS OF THE DRUMS WARRANT OFF-SITE DISPOSAL, THE SOLID CONTENTS WOULD ALSO BE DISPOSED OF OFF-SITE IN ACCORDANCE WITH APPLICABLE REGULATIONS.

IV) EXCAVATING CONTAMINATED SURFACE SOIL DETECTED IN THE MORE EASILY ERODED AREAS NEAR THE WOLF RIVER AND THE ABANDONED DREDGE A POND AND CONSOLIDATING ALL EXCAVATED MATERIAL ON THE SITE BENEATH THE FINAL COVER.

V) SUPPLY, PLACE AND COMPACT APPROXIMATELY 67,000 CUBIC YARDS OF COMMON FILL OVER THE WEST SECTOR TO INCREASE THE FINAL COVER THICKNESS BY AN ADDITIONAL TWELVE INCHES TO A TOTAL THICKNESS OF 24 INCHES;

VI) SUPPLY, PLACE AND COMPACT APPROXIMATELY 82,000 CUBIC YARDS OF COMMON FILL OVER THE EAST SECTOR TO INCREASE THE FINAL COVER THICKNESS BY AN ADDITIONAL SIXTEEN INCHES TO A TOTAL THICKNESS OF 24 INCHES;

VII) BROADCAST FERTILIZING AND SEEDING OF THE LANDFILL SURFACE;

IX) PLACING PEGGED SOD ALONG DRAINAGE SWALES AND ON STEEP SLOPES OF THE LANDFILL; AND

X) INSTALLING APPROXIMATELY 3,900 FEET AND 3,300 FEET OF STANDARD CHAIN-LINK FENCING TO COMPLETE THE PERIMETER FENCING OF THE WEST AND EAST SECTORS, RESPECTIVELY.

THE EXTENT OF REMEDIAL ACTIVITIES ARE SHOWN ON FIGURE 7. ESTIMATED COSTS ARE SHOWN IN TABLE 23.

MAINTENANCE ACTIVITIES WILL INCLUDE:

I) PERIODIC INSPECTION OF THE LANDFILL SURFACE INCLUDING SLOPES;

II) PERIODIC INSPECTION OF THE MONITORING WELL NETWORK AND SITE FENCE;

III) PERIODIC MOWING OF THE VEGETATION OVER THE 70-ACRE LANDFILL;

IV) THE APPLICATION OF FERTILIZER AT A SPECIFIED FREQUENCY;

V) RE-ESTABLISHMENT OF VEGETATION OVER DISTRESSED AREAS;

VI) PERIODIC REPAIR OF AREAS ERODED BY SURFACE WATER RUNOFF OR BY FLOODING OF THE WOLF RIVER;

VII) MAINTENANCE OF THE SITE FENCE AND SIGNS; AND

VIII) CONTROL OF BURROWING ANIMALS.

MONITORING ACTIVITIES WILL INCLUDE:

I) PERIODIC COLLECTION OF WATER LEVEL MEASUREMENTS FROM THE EXISTING MONITORING WELL NETWORK AND THE CONTINUOUS WATER LEVEL MONITORING OF THE WOLF RIVER;

II) PERIODIC SAMPLING AND ANALYSIS OF GROUNDWATER FROM THE MONITORING WELL NETWORK;

III) PERIODIC SAMPLING AND ANALYSIS OF SURFACE WATER FROM THE WOLF RIVER; AND

IV) PERIODIC SAMPLING AND ANALYSIS OF FISH FROM THE WOLF RIVER.

THE ACLS (SEE TABLE 20, SUMMARY OF SITE RISKS) SET FOR THE SHALLOW GROUNDWATER MASS FLUX INTO THE RIVER WILL BE MONITORED AT THE EDGE OF THE WASTE MANAGEMENT AREA. SHOULD THE MASS FLUX OF SHALLOW GROUNDWATER FROM THE SITE INCREASE AND START EXCEEDING THE ACLS ON A CONTINUAL BASIS (SEE PAGE 64 FOR THE SHALLOW GROUNDWATER MONITORING CRITERIA), THE CONTINGENCY ALTERNATIVE 3, (GROUNDWATER PUMP AND DISCHARGE TO THE CITY SEWER) WILL BE IMPLEMENTED TO CONTROL CONTAMINATED GROUNDWATER FLOW INTO THE RIVER TO BELOW THE (10-6) RISK LEVEL. THE POINT OF COMPLIANCE FOR THE GROUNDWATER WILL BE THE EDGE OF THE WASTE MANAGEMENT AREA. IF NECESSARY, PRETREATMENT WILL BE CONDUCTED PRIOR TO DISCHARGING THE CONTAMINATED GROUNDWATER INTO THE CITY SEWER.

IN ADDITION TO THE ABOVE ACTIVITIES, VARIOUS SUPPORT ACTIVITIES WILL BE CONDUCTED INCLUDING:

I) THE IMPLEMENTATION OF A WORKER HEALTH AND SAFETY PROGRAM;

II) ENVIRONMENTAL MONITORING FOR DUST AND PARTICULATE INDICATOR PESTICIDE EMISSIONS; AND

III) THE IMPLEMENTATION OF A SOIL EROSION CONTROL PROGRAM DURING CONSTRUCTION AND IN THE INTERIM PERIOD FOLLOWING CONSTRUCTION DURING ESTABLISHMENT OF VEGETATION OVER THE UPGRADED LANDFILL COVER.

SURFACE WATER IMPOUNDMENTS

THE SELECTED REMEDY FOR THE SURFACE WATER IMPOUNDMENTS IS ALTERNATIVE 4 INVOLVING THE CONTAINMENT OF CONTAMINATED SEDIMENTS IN THE IMPOUNDMENTS USING HYDRAULIC FILL. PRIOR TO THE REMEDIAL ACTION DURING THE DESIGN PHASE, ADDITIONAL SAMPLING OF THE SEDIMENTS AND FISH IN THE IMPOUNDMENTS WILL BE PERFORMED DUE TO THE CHANGES THAT CAN OCCUR TO THE SEDIMENT IN A SURFACE WATER BODY OVER TIME.

THIS SAMPLING WILL BE DONE CONCURRENTLY WITH THE DESIGN SO AS NOT TO DELAY THE REMEDIATION PROCESS. THE SAMPLING WILL BE DONE TO VERIFY THE CONDITION OF THE IMPOUNDMENTS, TO BETTER DEFINE THE CONTAMINATED AREAS AND TO DETERMINE ACCEPTABLE SEDIMENT CONCENTRATIONS BASED ON A 10(-6) RISK FOR FISH CONSUMPTION. ACCEPTABLE SEDIMENT CONTAMINANT LEVELS WILL BE CALCULATED USING LEVELS PRESENTLY FOUND IN THE IMPOUNDMENT SEDIMENTS AND FISH, AND THE ACCEPTABLE FISH TISSUE CONCENTRATION LEVELS IN TABLE 24. THIS SAMPLING WILL NOT AFFECT THE SELECTED REMEDY UNLESS FISH AND SURFACE SEDIMENT CONTAMINATION CONCENTRATIONS HAVE DECREASED TO WITHIN ACCEPTABLE RISK LEVELS.

THE SELECTED REMEDY WILL INCLUDE THE FOLLOWING ACTIVITIES:

I) THE IMPLEMENTATION OF A DETAINED BOTTOM PROFILE SURVEY USING SONAR TECHNIQUES TO DETERMINE PRE-FILL CONDITIONS;

II) THE CONSTRUCTION OF ROUGH GRADED ACCESS ROADS TO THE IMPOUNDMENTS;

III) THE INSTALLATION OF A PIPELINE AND DISCHARGE HEADERS FROM THE INACTIVE DREDGE POND LOCATED NORTH OF THE WOLF RIVER TO THE ABANDONED DREDGE POND AND OXBOW LAKE;

IV) THE INSTALLATION OF GEOFABRIC ONTO SLOPES AND BOTTOM SURFACES OF THE IMPOUNDMENT WHICH MAY BE SUSCEPTIBLE TO SCOUR DURING THE HYDRAULIC FILL OPERATION;

V) THE PLACEMENT OF DREDGED FILL BY HYDRAULIC METHODS IN THE DREDGE POND AND THE OXBOW LAKE;

VI) THE PLACEMENT OF DREDGED AND STOCKPILED BACKFILL ONTO THE UPPER SLOPES WHICH CANNOT BE COVERED EFFECTIVELY BY HYDRAULIC METHODS;

VII) THE EXCAVATION OF SEDIMENTS FROM THE BEAVER POND AND PLACEMENT OF THESE SEDIMENTS IN THE OXBOW LAKE PRIOR TO HYDRAULIC FILL;

VIII) THE IMPLEMENTATION OF A POST-CONSTRUCTION BOTTOM PROFILE SURVEY IN THE ABANDONED DREDGE POND TO CONFIRM THE FILL THICKNESS; AND

IX) THE HARVESTING AND RESTOCKING OF FISH FROM THE IMPOUNDMENTS.

GEOFABRIC WILL BE PLACED OVER THE CONTAMINATED SURFACE OF THE OXBOW LAKE AND ALONG CONTAMINATED SHALLOW SLOPES OF THE ABANDONED DREDGE POND DUE TO THE POTENTIAL SCOUR AND SUSPENSION OF CONTAMINATED SEDIMENTS WHILE PLACING FILL HYDRAULICALLY. THE GEOFABRIC SHEETS WILL BE PRESTITCHED TOGETHER PRIOR TO PLACEMENT AND WILL BE SUNK INTO POSITION USING SANDBAGS. PRIOR TO FILLING, THE GEOFABRIC WILL BE SECURELY ANCHORED BY STAKING.

THE PLACEMENT OF HYDRAULIC FILL WILL BE PERFORMED IN A CONTROLLED MANNER. DREDGED FILL WILL BE DISCHARGED INITIALLY OVER THE DEEPEST AREAS OF THE IMPOUNDMENTS TO BE COVERED AND PROCEED TOWARDS THE MORE SHALLOW AREAS. PRIOR TO COVERING THE OXBOW LAKE CONTAMINATION THE CONTAMINATED SEDIMENTS FROM THE BEAVER POND WILL BE EXCAVATED AND PLACED ON THE SLOPES OF THE OXBOW. THE ABANDONED DREDGE POND WILL RECEIVE A COVER THICKNESS OF THREE FEET. DUE TO THE DIFFICULTY OF PLACING FILL BY HYDRAULIC METHODS DIRECTLY AGAINST SHALLOW SLOPES IN THE DREDGE POND, THESE SLOPES WILL BE COVERED BY MECHANICAL MEANS. DREDGED MATERIAL WILL BE DISCHARGED ONTO A SPOIL AREA ADJACENT TO THE WOLF RIVER AND DRAINED FOR USE AS BACKFILL MATERIAL. THIS BACKFILL MATERIAL WILL BE MECHANICALLY PLACED OVER THE UPPER SLOPES OF THE DREDGE POND WHERE HYDRAULIC FILLING IS INEFFECTIVE. IT IS ANTICIPATED THAT MECHANICAL DEWATERING WILL BE REQUIRED TO LOWER THE WATER LEVEL IN THE DREDGE POND DURING MECHANICAL PLACEMENT OF THE DREDGED FILL.

UPON COMPLETION OF THE FILL OPERATIONS, THE FISH REMAINING IN THE ABANDONED DREDGE POND WILL BE HARVESTED. A POST-CONSTRUCTION BOTTOM PROFILE SURVEY WILL BE CONDUCTED IN THE COMPLETED DREDGE POND TO VERIFY THE UNIFORMITY OF THE FILL OPERATION. DISTURBED AREAS AROUND THE IMPOUNDMENTS WILL BE RESTORED BY RESEEDING AS NECESSARY AND THE IMPOUNDMENTS WILL BE RESTOCKED WITH FISH.

FIGURES 8 THROUGH 10 ILLUSTRATES THE EXTENT OF THE REMEDIAL CONSTRUCTION ACTIVITIES REQUIRED FOR THIS ALTERNATIVE. ESTIMATED COSTS ARE SHOWN IN TABLE 25.

A LONG-TERM MONITORING PROGRAM FOR THE SURFACE WATER IMPOUNDMENTS WOULD BE IMPLEMENTED AFTER THE REMEDIATION IS COMPLETE TO VERIFY THAT SEDIMENT LEVELS DO NOT INCREASE ABOVE THE (10-6) HEALTH BASED LEVELS SET DURING THE REMEDIAL DESIGN.

#SD
STATUTORY DETERMINATIONS

UNDER ITS LEGAL AUTHORITIES, EPA'S PRIMARY RESPONSIBILITY AT SUPERFUND SITES IS TO UNDERTAKE REMEDIAL ACTIONS THAT ACHIEVE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. IN ADDITION, SECTION 121 OF CERCLA ESTABLISHES SEVERAL OTHER STATUTORY REQUIREMENTS AND PREFERENCES. THESE SPECIFY THAT WHEN COMPLETE, THE SELECTED REMEDIAL ACTION OR THIS SITE MUST COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE ENVIRONMENTAL STANDARDS ESTABLISHED UNDER FEDERAL AND STATE ENVIRONMENTAL LAWS UNLESS A STATUTORY WAIVER IS JUSTIFIED. THE SELECTED REMEDY ALSO MUST BE COST EFFECTIVE AND UTILIZE PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. FINALLY, THE STATUTE INCLUDES A PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT THAT PERMANENTLY AND SIGNIFICANTLY REDUCE THE VOLUME, TOXICITY, OR MOBILITY OF HAZARDOUS WASTES AS THEIR PRINCIPAL ELEMENT. THE FOLLOWING SECTIONS DISCUSS HOW THE SELECTED REMEDY MEETS THESE STATUTORY REQUIREMENTS.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

BASED ON THE SITE RISK ASSESSMENT, LONG TERM EXPOSURE TO CONTAMINANTS THROUGH THE CONSUMPTION OF CONTAMINATED FISH IS THE IDENTIFIED RISK ASSOCIATED WITH THE SITE. AND ALTHOUGH NO EXCESSIVE RISK WAS IDENTIFIED FOR EXPOSURE TO THE LANDFILL, THIS RISK LEVEL WAS BASED ON PRESENT CONDITIONS WHICH INCLUDE A TEMPORARY COVER OVER THE SITE.

THE PLACEMENT OF THE LOW PERMEABILITY SANITARY LANDFILL COVER OVER THE SITE AND HYDRAULIC FILL

OVER THE CONTAMINATED SEDIMENTS PROTECTS HUMAN HEALTH AND THE ENVIRONMENT BY REMOVING AND CONTAINING THE CONTAMINANTS AWAY FROM THE EXPOSURE PATHWAY. THE LANDFILL CONTAMINANTS AND CONTAMINATED SEDIMENTS WILL BE CONTAINED SO THAT PLANT AND ANIMAL LIFE WILL NO LONGER COME IN CONTACT WITH AND BIOACCUMULATE THE CONTAMINATION. THE CONTAMINATED FISH WILL THEN BE REMOVED AND THE SURFACE WATER IMPOUNDMENTS RESTOCKED. THE CANCER RISK ASSOCIATED WITH THE SITE WILL BE REDUCED TO AROUND 1 X (10-6) AND THE HAZARD INDICES (HI) RATIO WILL BE LESS THAN 1.

THERE WILL BE NO UNACCEPTABLE SHORT-TERM THREATS OR CROSS MEDIA IMPACTS ASSOCIATED WITH THE SELECTED REMEDIES THAT CANNOT BE READILY CONTROLLED SINCE ONLY MINIMAL CONTACT WITH OR MOVEMENT OF THE WASTES WILL OCCUR.

COMPLIANCE WITH ARARS

THE SELECTED REMEDIES OF A LOW PERMEABILITY SOIL COVER FOR THE LANDFILL CONTAMINANTS, GROUNDWATER MONITORING, HYDRAULIC FILL CONTAINMENT OF CONTAMINATED SEDIMENTS IN THE IMPOUNDMENTS, AND REMOVAL OF THE CONTAMINATED FISH WILL COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). THE ARARS ARE PRESENTED BELOW.

ACTION SPECIFIC ARARS:

* TENNESSEE SOLID WASTE REGULATIONS, RULE 1200-1-7 - 001-007
* TENNESSEE WATER QUALITY CONTROL ACT, TN CODE 69-3-104
* CLEAN WATER ACT (40 CFR 122), INCLUDING SECTION 404
* NATIONAL PRETREATMENT STANDARDS (40 CFR 403)
* CHAPTER 33 OF THE MEMPHIS CODE RELATED TO "SEWER AND SEWAGE DISPOSAL" (MEMPHIS SEWER ORDINANCE)
* USFDA EDIBLE PORTION OF FISH LEVELS
* AND NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY (40 CFR 50)

CHEMICAL SPECIFIC ARARS:

* TENNESSEE WATER QUALITY CRITERIA (1200-4)

LOCATION SPECIFIC ARARS:

* NONE

RCRA LAND DISPOSAL RESTRICTIONS (LDRS) ARE NOT APPLICABLE TO THIS REMEDIAL ACTION SINCE THE CONSOLIDATION OF WASTE WITHIN THE AREA OF CONTAINMENT (WHICH IS BEING PERFORMED FOR THE FLOOD PLAIN AREAS OF THE LANDFILL AND PART OF THE CONTAMINATED SEDIMENTS) DOES NOT CONSTITUTE "PLACEMENT." THEREFORE LDRS DO NOT APPLY. THE FEDERAL SAFE DRINKING WATER ACT (SDWA) DOES NOT APPLY TO THE SHALLOW GROUNDWATER BENEATH THE SITE SINCE THE CONTAMINATED GROUNDWATER IS ONLY BENEATH THE SITE AND FLOWS DIRECTLY INTO THE WOLF RIVER. INSTITUTIONAL CONTROLS BY SHELBY COUNTY CONTROLLING THE PLACEMENT OF WELLS INTO THE SHALLOW AQUIFER INSIDE OF THE MEMPHIS CITY LIMITS AND LAND RESTRICTIONS ALSO PRECLUDE THE CONTAMINATED GROUNDWATER FROM BEING USED A DRINKING WATER SOURCE.

COST EFFECTIVENESS

THE SELECTED REMEDIES ARE COST-EFFECTIVE BECAUSE THEY HAVE BEEN DETERMINED TO PROVIDE OVERALL EFFECTIVENESS PROPORTIONAL TO THEIR COSTS. ALTERNATIVE 2 FOR THE LANDFILL WASTES AND GROUNDWATER IS THE LEAST COSTLY OF ALTERNATIVES 2, 3 AND 4 WHICH MEET ALL ARARS AND ARE EQUALLY PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. ALTERNATIVE 4 FOR THE SURFACE WATER IMPOUNDMENTS IS COMPARABLE IN COST TO ALTERNATIVES 3 AND 6 WHICH ALSO MEET ALL EVALUATION CRITERIA, BUT ALTERNATIVE 4 HAS A LESSER DEGREE OF SHORT-TERM IMPACTS AND COST VARIABILITY.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

US EPA AND THE STATE OF TENNESSEE BELIEVE THE SELECTED REMEDY REPRESENTS THE MAXIMUM EXTENT TO WHICH PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES CAN BE UTILIZED IN A COST-EFFECTIVE MANNER FOR THE FINAL REMEDY AT THE NORTH HOLLYWOOD SITE. OF THE ALTERNATIVES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLY WITH ARARS, US EPA AND THE STATE HAVE DETERMINED

THAT THE SELECTED REMEDY PROVIDES THE BEST BALANCE OF TRADE-OFFS IN TERMS OF LONG-TERM EFFECTIVENESS AND PERMANENCE, REDUCTION IN TOXICITY, MOBILITY OR VOLUME ACHIEVED THROUGH TREATMENT, SHORT-TERM EFFECTIVENESS, IMPLEMENTABILITY, COST, ALSO CONSIDERING THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT AND CONSIDERING STATE AND COMMUNITY ACCEPTANCE.

THE SELECTED REMEDIES FOR THE CONTAINMENT OF THE LANDFILL WASTES AND THE SURFACE WATER IMPOUNDMENTS CAN BE IMPLEMENTED AND COMPLETED MORE QUICKLY, WITH LESS DIFFICULTY, AND AT LESS COST THAN TREATMENT TECHNOLOGIES DUE TO THE VAST AMOUNT OF MATERIAL AND THE LOW LEVELS OF CONTAMINATION PRESENT AT THE SITE.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

IN SELECTING THE REMEDIES FOR THE NORTH HOLLYWOOD DUMP, EPA CONSIDERED THE USE OF TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT POSSIBLE. AS STATED PREVIOUSLY, HOWEVER, DUE TO HIGH COSTS AND IMPLEMENTATION PROBLEMS FOR TREATMENT USE AT A LARGE MUNICIPAL LANDFILL AND SINCE NO SIGNIFICANT CHANGES IN RISK LEVELS WOULD OCCUR WITH THE CONTAINMENT OF THE WASTE, TREATMENT WAS NOT CONSIDER AN EFFECTIVE OPTION FOR NORTH HOLLYWOOD DUMP.

#DSC
DOCUMENTATION OF SIGNIFICANT CHANGES

THE PREFERRED ALTERNATIVE (ALTERNATIVE 4) FOR THE SURFACE WATER IMPOUNDMENTS ORIGINALLY DID NOT INTEND TO REMOVE AND RESTOCK THE CONTAMINATED FISH FROM THE SURFACE WATER IMPOUNDMENTS IN ADDITION TO PLACING HYDRAULIC FILL OVER THE CONTAMINATED SEDIMENTS. THE SELECTED REMEDY FOR THE SURFACE WATER IMPOUNDMENTS WILL INCLUDE THE REMOVAL OF CONTAMINATED FISH FROM THE SURFACE WATER IMPOUNDMENTS AS WELL AS THE HYDRAULIC CONTAINMENT OF THE CONTAMINATED SEDIMENTS.

ORIGINALLY, INSTITUTIONAL FISHING RESTRICTIONS WERE GOING TO BE KEPT IN PLACE TO WARN RESIDENTS FROM EATING CONTAMINATED FISH FROM THE IMPOUNDMENTS. HOWEVER, PUBLIC COMMENTS (SEE RESPONSIVENESS SUMMARY) INDICATED THE RESIDENT WILL LIKELY CONTINUE TO FISH IN THE IMPOUNDMENTS REGARDLESS OF POSTED RESTRICTS. IN THE INTEREST OF PUBLIC HEALTH AND TO QUICKEN THE CLEAN-UP'S EFFECT ON THE ENVIRONMENT, FISH FROM THE IMPOUNDMENTS WILL BE REMOVED DURING THE REMEDIAL ACTION AND THE IMPOUNDMENTS WILL BE RESTOCKED AFTER REMEDIATION. THE IMPOUNDMENTS WILL BE RESTOCKED DUE TO THE POTENTIAL FOR ENVIRONMENTAL EFFECTS ON THE AREA'S WILDLIFE AND THEIR FOOD SUPPLY SHOULD THE FISH NOT BE REPLACED. IT IS NOT THE INTENT OF EPA TO APPROVE OF FISHING IN THE IMPOUNDMENTS UNTIL IT IS DETERMINED THAT IT IS SAFE AGAIN TO FISH.

#RES
I. RESPONSIVENESS SUMMARY OVERVIEW

THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) HELD A PUBLIC COMMENT PERIOD FROM JUNE 28 THROUGH JULY 27, 1990 FOR INTERESTED PARTIES TO COMMENT ON THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/KS) RESULTS AND THE PROPOSED PLAN FOR THE NORTH HOLLYWOOD DUMP SITE IN MEMPHIS, TENNESSEE.

THE PROPOSED PLAN, INCLUDED IN ATTACHMENT A OF THIS DOCUMENT, PROVIDES A SUMMARY OF THE SITE'S BACKGROUND INFORMATION LEADING UP TO THE PUBLIC COMMENT PERIOD SPECIFICALLY, THE PROPOSED PLAN INCLUDES THE FOLLOWING SECTIONS: INTRODUCTION SITE BACKGROUND, SCOPE AND ROLE OF THE RESPONSE ACTION, SUMMARY OF SITE RISKS, SUMMARY OF ALTERNATIVES, EVALUATION AND ANALYSIS OF ALTERNATIVES, THE COMMUNITY'S ROLE IN THE SELECTION PROCESS, LIST OF CONTACTS, GLOSSARY OF EVALUATION CRITERIA, AND GLOSSARY OF TERMS.

EPA HELD A PUBLIC MEETING AT 7:30 PM ON JUNE 28, 1990 AT THE BOARD OF EDUCATION FACILITY IN MEMPHIS, TENNESSEE TO OUTLINE THE RI/FS AND DESCRIBE EPA'S PROPOSED REMEDIAL ALTERNATIVES FOR CONTAMINANTS FOUND IN THE LANDFILL, GROUNDWATER, LAKES, AND SEDIMENTS AT THE NORTH HOLLYWOOD DUMP SITE. ALL COMMENTS RECEIVED BY EPA DURING THE PUBLIC COMMENT PERIOD WILL BE CONSIDERED IN THE FINAL SELECTION OF A REMEDIAL ALTERNATIVE FOR THE AREAS OF CONTAMINATION AT THE NORTH HOLLYWOOD DUMP SITE.

THE RESPONSIVENESS SUMMARY, REQUIRED BY THE SUPERFUND LAW, PROVIDES A SUMMARY OF CITIZENS' COMMENTS AND CONCERNS IDENTIFIED AND RECEIVED DURING THE PUBLIC COMMENT PERIOD, AND EPA'S RESPONSES TO THOSE COMMENTS AND CONCERNS.

THIS RESPONSIVENESS SUMMARY IS ORGANIZED INTO THE FOLLOWING SECTIONS AND ATTACHMENTS;

I. RESPONSIVENESS SUMMARY OVERVIEW. THIS SECTION OUTLINES THE PURPOSES OF THE PUBLIC COMMENT PERIOD AND THE RESPONSIVENESS SUMMARY. IT ALSO REFERENCES THE APPENDED BACKGROUND INFORMATION LEADING UP TO THE PUBLIC COMMENT PERIOD.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS. THIS SECTION PROVIDES & BRIEF HISTORY OF COMMUNITY CONCERNS AND INTEREST IDENTIFIED AS PART OF THE COMMUNITY RELATIONS PLAN AND DURING THE RI/KS.

III. SAY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS. THIS SECTION SUMMARIZES THE ORAL COMMENTS RECEIVED BY EPA AT THE JUNE 28, 1990 PUBLIC MEETING, AND PROVIDES EPA'S RESPONSES TO THESE COMMENTS.

IV. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA'S RESPONSES TO THESE COMMENTS. THIS SECTION CONTAINS THE ONE LETTER RECEIVED BY EPA CONTAINING WRITTEN COMMENTS, AS WELL AS EPA'S WRITTEN RESPONSE TO THAT LETTER.

ATTACHMENT A: ATTACHMENT A CONTAINS THE PROPOSED PLAN WHICH WAS DISTRIBUTED TO THE PUBLIC DURING THE PUBLIC MEETING HELD ON JUNE 28, 1990 AND MAILED TO THE INFORMATION REPOSITORY AND THOSE INCLUDED ON THE MAILING LIST.

ATTACHMENT B: ATTACHMENT B INCLUDES THE SIGN IN SHEETS FROM THE PUBLIC MEETING HELD ON JUNE 28, 1990 AT THE BOARD OF EDUCATION FACILITY, 2597 AVERY AVENUE, MEMPHIS, TENNESSEE.

ATTACHMENT C: ATTACHMENT C INCLUDES NAMES, ADDRESSES AND PHONE NUMBERS OF THE INFORMATION REPOSITORIES DESIGNATED FOR THE NORTH HOLLYWOOD DUMP SITE.

ATTACHMENT D: ATTACHMENT D INCLUDES THE OFFICIAL TRANSCRIPT OF HE PUBLIC HEARING ON THE PROPOSED PLAN FOR THE CLEANUP OF THE NORTH HOLLYWOOD DUMP NATIONAL PRIORITIES LIST SITE LOCATED IN MEMPHIS, TENNESSEE.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

A. BACKGROUND ON COMMUNITY INVOLVEMENT

FREQUENT PRINT, RADIO AND TELEVISION MEDIA COVERAGE ON THE SITE BEGAN IN 1980 AND CONTINUED THROUGH 1984. MEDIA COVERAGE FROM 1984 TO 1990 WAS INFREQUENT AND SPORADIC. THE MOST ACTIVE PERIOD OF COMMUNITY INVOLVEMENT WAS FROM 1980 TO 1981. DURING THIS TIME, CITIZENS OF NORTH HOLLYWOOD BECAME CONCERNED ABOUT THE TOXIC CHEMICALS BURIED AT THE SITE.

ENVIRONMENTAL GROUPS FORMED PRIOR TO AND DURING THE EARLY 1980'S, SUCH AS THE NORTH HOLLYWOOD HEALTH AND SAFETY COMMITTEE AND THE CYPRESS HEALTH AND SAFETY COMMITTEE (CHSC), EXPRESSED CONCERNS ABOUT THE SITE. COMMUNITY GROUPS AND ORGANIZATIONS BECAME INVOLVED WITH THE SITE. THESE GROUPS INCLUDED THE LEAGUE OF WOMEN'S VOTERS (LOWV), THE TENNESSEE ASSOCIATION OF COMMUNITY ORGANIZATION REFORM NOV (ACORN), THE URBAN LEAGUE (UL), TENNESSEEANS AGAINST CHEMICAL HAZARDS, AND THE TENNESSEE SELF HELP MISSIONS. EPA FORMED THE METRO AREA ENVIRONMENTAL TASK FORCE (MATF), CONSISTING OF REPRESENTATIVES FROM LOCAL CITIZENS GROUPS AND FEDERAL, COUNTY AND CITY GOVERNMENT PERSONNEL TO ADDRESS LOCAL CONCERNS REGARDING THE SITE AND OBTAIN PUBLIC COMMENTS REGARDING PLANS FOR SITE WORK.

IN DECEMBER 1980, STATE AND LOCAL OFFICIALS ANNOUNCED THE FORMATION OF THE TECHNICAL ACTION GROUP (TAG), CONSISTING OF REPRESENTATIVES FROM THE EPA, THE STATE AND OTHERS INCLUDING THE VELSICOL CHEMICAL CORPORATION, A POTENTIALLY RESPONSIBLE PARTY (PRP). THE TAG WAS ORGANIZED TO MAXIMIZE CLEANUP EFFORTS CONDUCTED BY VELSICOL. IN FEBRUARY 1981, THE TAG CONDUCTED A CLEANUP OF HOT SPOTS AT THE SITE.

AFTER THE DISCOVERY OF CONTAMINATED FISH IN THE WOLF RIVER, COUNTY COMMISSIONERS REQUESTED THAT THE MEMPHIS AND SHELBY COUNTY HEALTH DEPARTMENT (MSCHD) CONDUCT MEDICAL EXAMINATION OF PERSONS WHO REGULARLY ATE CHEMICALLY-CONTAMINATED FISH. THE MSCHD RAN TESTS ON FISH FROM TWO WHOLESALE DEALERS AND FOUND THAT PESTICIDE LEVELS IN THE FISH WERE WELL BELOW FOOD AND DRUG

ADMINISTRATION (FDA) LEVELS. WARNINGS AGAINST USING FISH AS A FOOD SOURCE WERE POSTED ALONG THE WOLF RIVER IN MARCH 1981.

ACCORDING TO INFORMATION OBTAINED FROM COMMUNITY INTERVIEWS CONDUCTED IN MARCH 1990, COMMUNITY MEMBERS WERE UNAWARE OF THE SITE STATUS AND ACTIVITIES CONDUCTED DURING THE PAST TWO TO THREE YEARS. RESIDENTS WHO WERE FAMILIAR WITH CURRENT CONDITIONS AT THE SITE STATED THAT FISHING NEAR THE SITE WAS STILL A PROBLEM. MOST RESIDENTS INTERVIEWED STATED THAT THE GOVERNMENTAL AGENCIES HANDING THE SITE REMEDIAL ACTIVITIES HAD DONE AN ACCEPTABLE JOB.

B. BACKGROUND ON COMMUNITY CONCERNS

FROM INFORMATION OBTAINED DURING THE COMMUNITY INTERVIEWS CONDUCTED IN MARCH 1990, THE SITE, WHICH WAS CONSIDERED BY THE COMMUNITY TO BE A HIGH PRIORITY DURING THE EARLY 1980'S, NO LONGER APPEARED TO BE AS HIGH OF A CONCERN TO THE MAJORITY OF HOLLYWOOD RESIDENTS. THE PEOPLE INTERVIEWED IN THE HOLLYWOOD COMMUNITY WERE GENERALLY UNAWARE OF THE SITE CONDITIONS AND ACTIVITIES CONDUCTED TO DATE, AND THEREFORE STATED NO CONCERNS. ONLY A FEW RESIDENTS LIVING NEAR THE SITE AND A NUMBER OF CITIZENS LIVING OUTSIDE THE HOLLYWOOD COMMUNITY WERE FAMILIAR WITH THE SITE AND EXPRESSED CONCERNS. THEIR CONCERNS ARE SUMMARIZED AS FOLLOWS:

1. HOLLYWOOD RESIDENTS STATED CONCERN REGARDING THEIR GENERAL HEALTH AND THE ENVIRONMENT. RESIDENTS HAD HEARD RUMORS REGARDING ILLNESSES DEVELOPED FROM THE TOXIC CHEMICALS BURIED AT THE SITE. THE COMMUNITY WOULD LIKE TO SEE THE SITE CLEANED UP AND MONITORED ON A REGULAR BASIS TO PROTECT THEIR HEALTH AND SAFETY.

2. SOME RESIDENTS STATED A MISTRUST FOR EPA AND LOCAL GOVERNMENT OFFICIALS.

3. HOLLYWOOD RESIDENTS EXPRESSED CONCERN THAT THOSE PERSONS FISHING AT THE SITE MAY BE SELLING POTENTIALLY SITE-CONTAMINATED FISH TO THE PUBLIC.

4. HOLLYWOOD RESIDENTS REQUESTED MORE INFORMATION ABOUT THE SITE. THEY CLAIMED THAT NO INFORMATION HAD BEEN RECEIVED SINCE THE HEALTH SURVEYS WERE CONDUCTED APPROXIMATELY TWO TO THREE YEARS AGO.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC MEETING CONDUCTED ON JUNE 28, 1990 AND EPA'S RESPONSES TO THESE COMMENTS

COMMENT: A LOCAL RESIDENT QUESTIONED WHY A LANDFILL COVER OF ONLY 24 INCHES WAS CONSIDERED AND WHAT THE COVER WAS TO CONSIST OF.

RESPONSE: EPA CLASSIFIED THE NORTH HOLLYWOOD DUMP AS A MUNICIPAL WASTE LANDFILL RATHER THAN A HAZARDOUS WASTE LANDFILL. THE BORINGS OBTAINED AT THE SITE FOUND TREE STUMPS, BURNED DEBRIS AND ASH. UNDER EPA'S CLASSIFICATION, THE MOST APPROPRIATE REGULATION FOR THIS SITE WAS TO CLOSE THE LANDFILL AS A SANITARY LANDFILL; REQUIRING A 24 INCH COVER OF LOW PERMEABILITY SOIL.

COMMENT: A LOCAL RESIDENT QUESTIONED IF GROUNDWATER FROM THE DUMP WAS GOING ONLY TO THE WOLF RIVER; NOT BEYOND.

RESPONSE: EPA CAREFULLY INVESTIGATED THE FLOW OF GROUNDWATER THROUGH THE SITE TO THE WOLF RIVER. EPA WAS CONCERNED ABOUT THE POSSIBILITY OF:

1. CONTAMINATED GROUNDWATER IN THE SURFICIAL AQUIFER UNDER THE SITE MIGRATING INTO THE LOWER, CONFINED, DRINKING WATER AQUIFER; AND

2. GROUNDWATER IN THE SURFICIAL AQUIFER FLOWING UNDER THE WOLF RIVER AND CONTAMINATING AREAS TO THE NORTH OF THE WOLF RIVER.

DETAILED STUDIES INDICATED THAT A CONTINUOUS CLAY LAYER, 100 TO 200 FEET IN THICKNESS, SEPARATED THE UNDERLYING DRINKING WATER AQUIFER (THE MEMPHIS SANDS) FROM CONTAMINANTS IN THE SURFICIAL AQUIFER (THE FLUVIAL SANDS). HYDRAULIC GRADIENTS CLEARLY SHOWED THAT THE WATER WAS FLOWING TOWARD AND CONVERGING AT THE WOLF RIVER FROM BOTH THE NORTH AND SOUTH SIDES OF THE WOLF RIVER. PRESSURE GRADIENTS ALSO INDICATED THAT GROUNDWATER WITHIN THE SURFICIAL AQUIFER WAS RISING INTO THE WOLF RIVER, RATHER THAN FLOWING UNDER IT.

COMMENT: A LOCAL RESIDENT QUESTIONED WHY CONTAMINATION WARNING SIGNS WERE POSED AT THE PONDS LOCATED NORTH OF INTERSTATE 240 AND IF CONTAMINATED FISH WERE FOUND IN THE PONDS.

RESPONSE: CONTAMINATED FISH WERE FOUND IN THE AFOREMENTIONED PONDS AND BOTH UPSTREAM AND DOWNSTREAM OF THE SITE IN THE WOLF RIVER. CONTAMINATION FOUND IN THE PONDS NORTH OF INTERSTATE 240 AND UPSTREAM IN THE WOLF RIVER DID NOT ORIGINATE FROM THE SITE, ADDITIONAL SOURCES OF CONTAMINATION EXISTED IN THIS AREA.

COMMENT: A LOCAL RESIDENT QUESTIONED IF THE NORTH HOLLYWOOD DUMP POSED A POTENTIAL RISK FOR FISHING IN THE WOLF RIVER.

RESPONSE: DATA FROM EPA'S INVESTIGATION INDICATES THAT THE NORTH HOLLYWOOD DUMP ITSELF DOES NOT POSE A SIGNIFICANT RISK TO FISHING IN THE WOLF RIVER, AND EXTENSIVE MONITORING WILL BE UNDERTAKEN TO INSURE THAT NO POTENTIAL RISK INADVERTANTLY DEVELOPS IN THE FUTURE. GROUNDWATER FLOWING FROM THE DUMP CONTAINS MOSTLY PESTICIDES AND METALS WHICH MOVE VERY SLOWLY TOWARD THE WOLF RIVER. THESE COMPOUNDS EXIST ONLY IN CONCENTRATIONS BELOW LEVELS WHICH WOULD SIGNIFICANTLY AFFECT THE FISH IN THE WOLF RIVER.

COMMENT: A CITIZEN QUESTIONED WHY EPA WAS GOING TO CONDUCT ANY SITE REMEDIAL WORK IF THERE WAS A RELATIVELY LOW RISK ASSOCIATED WITH THE CONTAMINANTS ORIGINATING FROM THE SITE.

RESPONSE: DESPITE THE LOW RISK ASSOCIATED WITH THE SITE, THE SITE DOES NOT MEET FEDERAL AND STATE REGULATORY STANDARDS. EPA WILL CONTINUE TO MONITOR THE GROUNDWATER LEAVING THE NORTH HOLLYWOOD DUMP AND FLOWING TOWARD THE WOLF RIVER.

COMMENT: A LOCAL RESIDENT ASKED EPA TO EXPLAIN THE PREFERRED ALTERNATIVE FOR THE REMEDIATION OF OXBOW LAKE AND THE DREDGE LAKE.

RESPONSE: THE PREFERRED ALTERNATIVE FOR REMEDIATION OF OXBOW LAKE AND THE DREDGE LAKE CONSISTED OF A THREE FOOT CLAY COVER PLACED ON THE BOTTOMS OF THE LAKES TO KEEP BIOTA (I.E., FISH) FROM COMING IN CONTACT WITH PLANT LIFE GROWING IN CONTAMINATED AREAS.

COMMENT: A LOCAL RESIDENT QUESTIONED IF THE SEDIMENT COVERS WOULD ALLOW PEOPLE TO CONSUME FISH OBTAINED FROM OXBOW LAKE AND THE DREDGE LAKE AND NOT BECOME CONTAMINATED.

RESPONSE: FISHING RESTRICTIONS WOULD BE PLACED ON THE AFOREMENTIONED LAKES UNTIL FUTURE PERIODIC FISH STUDIES INDICATED THAT THE FISH WERE ACCEPTABLE FOR HUMAN CONSUMPTION. BASED ON PUBLIC CONCERNS ABOUT FISHING AND THE EFFECT OF CONTAMINATED FISH ON THE ANIMAL FOOD CHAIN, THE FISH IN THE LAKES WILL BE REMOVED, AND THE LAKES RESTOCKED.

COMMENT: A LOCAL RESIDENT QUESTIONED WHEN IT WOULD BE SAFE TO FISH IN OXBOW LAKE AND THE DREDGE LAKE.

RESPONSE: ONCE EPA SAMPLING INDICATED THAT THE FISH WERE NO LONGER CONTAMINATED, FISHING COULD RESUME IMMEDIATELY. THE ANTICIPATED TIME FRAME WAS APPROXIMATELY FIVE YEARS, THE LIFE SPAN OF THE CONTAMINATED FISH, ONCE THE COVERS WERE IN PLACE. HOWEVER, OXBOW LAKE AND THE DREDGE POND ARE LOCATED ON PRIVATE PROPERTY AND EPA WILL NOT DETERMINE IF FISHING IS ALLOWED ON THE PROPERTY, ONLY IF THE FISH ARE SAFE FOR CONSUMPTION.

COMMENT: A LOCAL RESIDENT QUESTIONED THE MOBILIZATION OF CHLORDANE IN THE GROUNDWATER.

RESPONSE: SAMPLING RESULTS INDICATED THAT CONCENTRATIONS OF CHLORDANE FOUND IN THE GROUNDWATER WERE BELOW EPA ESTABLISHED STANDARDS AND WOULD NOT SIGNIFICANTLY AFFECT THE WOLF RIVER. TO ENSURE THAT CHLORDANE REMAINED RELATIVELY IMMOBILE, EPA WOULD INSTALL GROUNDWATER MONITORING WELLS ALONG THE WOLF RIVER TO ROUTINELY MEASURE THE CHLORDANE CONCENTRATIONS IN THE GROUNDWATER. SHOULD LEVELS EXCEED THE ESTABLISHED LEVELS IN THE FUTURE, MEASURES WOULD BE TAKEN TO REMEDIATE THE PROBLEM.

COMMENT: A LOCAL RESIDENT QUESTIONED WHY THE FENCE DID NOT TOTALLY ENCOMPASS THE SITE.

RESPONSE: THE FENCE WOULD BE UPGRADED TO TOTALLY ENCOMPASS THE SITE AND MAINTAINED AS PART OF THE REMEDY.

COMMENT: A CONCERNED RESIDENT HEARD THAT THE WOLF RIVER WAS NOT CONTAMINATED BY THE NORTH HOLLYWOOD DUMP AND WANTED TO KNOW HOW FISH BECAME CONTAMINATED WITH CHLORDANE.

RESPONSE: THE NORTH HOLLYWOOD DUMP SITE IS NOT THE ONLY SOURCE OF CONTAMINATION FOUND ALONG THE WOLF RIVER. EPA HAS NOT BEEN ABLE TO PINPOINT ANY SIGNIFICANT POINT SOURCES TO DATE, BUT CHLORDANE IS USED IN MOST HOMES FOR TERMITE CONTROL. THE IMPACT OF THE SITE ON THE WOLF RIVER HAS DECREASED SIGNIFICANTLY OVER THE YEARS THAT EPA HAS STUDIED THIS SITE. STUDIES INDICATE THAT THE SITE'S CURRENT IMPACT ON THE WOLF RIVER IS BELOW THE EPA ESTABLISHED WATER QUALITY CRITERIA.

COMMENT: A LOCAL RESIDENT QUESTIONED WHAT LEVEL OF PROTECTION WOULD BE REQUIRED FOR WORKERS EXCAVATING THE MATERIAL ON THE NORTH SIDE OF THE SITE, ADJACENT TO THE WOLF RIVER, FOR BURIAL IN THE MIDDLE OF THE SITE.

RESPONSE: EPA ESTIMATED THAT THE MATERIAL TO BE EXCAVATED WOULD REQUIRE LEVEL B OR C PERSONAL PROTECTIVE EQUIPMENT. THE LEVEL WOULD BE DETERMINED PRIOR TO RELEASING THE CONTRACT FOR BIDS. THE LEVEL WOULD DETERMINE THE HEALTH AND SAFETY REQUIREMENTS SPECIFIED IN THE DESIGN FOR REMEDIAL ACTION.

COMMENT: A LOCAL RESIDENT QUESTIONED IF EPA WAS AWARE THAT THE STATE OF TENNESSEE HAD ISSUED A NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO A LOCAL FACTORY ALLOWING THEM TO DISCHARGE WATER TO THE ABANDONED DREDGE POND.

RESPONSE: DURING THE PUBLIC MEETING, EPA AND THE STATE OF TENNESSEE SUPERFUND PROGRAM AGREED TO CHECK INTO THIS PERMIT. UPON REVIEW, THE STATE OF TENNESSEE IDENTIFIED AN INDUSTRY LOCATED ON CHELSEA STREET THAT HAS A NPDES PERMIT FOR DISCHARGE OF COOLING WATER. THE DISCHARGE ENTERS A CITY DRAINAGE DITCH WHICH LEADS TO THE WORKHOUSE BAYOU PUMPING STATION AND THEN TO THE WOLF RIVER. STORM DRAINAGE FROM THE NORTH SIDE OF THE PLANT ENTERS THE ABANDONED DREDGE POND THROUGH A CULVERT. RECENTLY, STATE PERSONNEL OBSERVED AN OILY MATERIAL IN THE DITCH. THE INDUSTRY HAS INSTALLED AN OIL-WATER SEPARATOR TO CONTROL THE OILY MATERIAL IN THE STORMWATER RUN-OFF. SINCE THE STORMWATER IS RECEIVING TREATMENT, THE EXISTING NPDES PERMIT WAS MODIFIED TO ADD ANOTHER DISCHARGE POINT.

THERE HAS BEEN NO CHANGE IN THE AMOUNT OF WATER ENTERING THE DREDGE POND (STORM WATER ONLY). THE STORM WATER IS NOW RECEIVING TREATMENT (AND BEING MONITORED) TO PREVENT CONTAMINANTS FROM ENTERING THE POND.

COMMENT: A LOCAL RESIDENT QUESTIONED IF THERE WERE ANY PROVISIONS AVAILABLE TO RESIDENTS TO HELP THE: UNDERSTAND THE TECHNICAL ISSUES PRESENTED IN THE PROPOSED PLAN FACT SHEET.

RESPONSE: EPA EXPLAINED THE TECHNICAL ASSISTANCE GRANT PROGRAM AND HOW RESIDENTS AND GROUPS COULD APPLY FOR THE GRANT. INFORMATION WAS PROVIDED IN THE PACKAGE OF HANDOUTS EPA PREPARED AND DISTRIBUTED TO THOSE ATTENDING THE MEETING.

COMMENT: A LOCAL CITIZEN WANTED TO KNOW HOW MANY SAMPLING POINTS EXISTED NORTH OF THE SITE ON THE WOLF RIVER.

RESPONSE: THERE WAS ONE WELL LOCATED NORTH OF THE SITE ON THE OTHER SIDE OF THE WOLF RIVER TO DEMONSTRATE A GROUNDWATER UPFLOW AND DISCHARGE TO THE WOLF RIVER CONSISTENT WITH THE FINDINGS ON THE SOUTH SIDE OF THE SITE. EPA WAS PRIMARILY CONCENTRATING ON MONITORING THE SITE ITSELF WITH MINIMAL SAMPLING ON THE NORTH SITE OF THE WOLF RIVER.

COMMENT: A LOCAL RESIDENT QUESTIONED THE HYDRAULICS OF THE SITE AREA; SPECIFICALLY THE UPWARD HYDRAULICS ON BOTH SIDES OF THE WOLF RIVER AND THE CONTINUITY OF THE UNDERLYING CLAY LAYER.

RESPONSE: MONITORING CONDUCTED BY EPA AND THE UNITED STATES GEOLOGICAL SURVEY (USGS) DEMONSTRATED THAT THE CLAY LAYER WAS CONTINUOUS FROM EACH SIDE OF THE WOLF RIVER. THE AFOREMENTIONED MONITORING INDICATED THAT GROUNDWATER DISCHARGE WAS TO THE WOLF RIVER.

COMMENT: A LOCAL RESIDENT QUESTIONED, IF CHOSEN AS AN ALTERNATIVE, HOW A BARRIER WOULD BE CONSTRUCTED SINCE THE LANDFILL WAS PERMEABLE.

RESPONSE: THE PROBLEM WITH THE BARRIER WOULD BE DIGGING THROUGH THE WASTE ITSELF IN ORDER TO CONSTRUCT IT. HYDRAULIC PUMPING WAS PREFERRED OVER THE BARRIER WALL AND WOULD PREVENT DISCHARGE TO THE WOLF RIVER.

COMMENT: A LOCAL RESIDENT QUESTIONED IF A MONITORING WELL WAS INSTALLED TO THE MEMPHIS AQUIFER LOCATED 500-1000 FEET BELOW LAND SURFACE AND, IF SO, STATED CONCERN ABOUT CONTAMINATING THE MEMPHIS AQUIFER.

RESPONSE: WELLS WERE NOT INSTALLED INTO THE MEMPHIS AQUIFER UNDER THE SUPPLEMENTAL RI BUT WERE INSTALLED UNDER THE TECHNICAL ACTION GROUP STUDY.

COMMENT: A LOCAL RESIDENT QUESTIONED IF SEVERE PUMPING FROM SOME OF THE GROUNDWATER WELLS WOULD CAUSE GROUNDWATER IN THE SURFACE AQUIFER TO PENETRATE INTO THE CONFINED AQUIFER.

RESPONSE: THERE COULD BE SOME AREAS IN THE OVERALL LARGER MEMPHIS VICINITY WHERE THIS WOULD BE POSSIBLE, BUT NOT IN THE AREA OF THE SITE BECAUSE OF THE EXISTING CLAY LAYER.

COMMENT: A RESIDENT WAS CONCERNED ABOUT THE FLOODING OF WOLF RIVER. HE RAISED THE QUESTION OF THE WOLF RIVER RECHARGING THE CONTAMINATED SHALLOW AQUIFER DURING FLOOD STAGES.

RESPONSE: EPA WAS CONCERNED THAT DURING FLOOD STAGES AN EXTENSIVE REVERSAL FLOW COULD OCCUR. EPA WAS ALSO CONCERNED THAT CONTAMINATION CONCENTRATIONS MEASURED IN THE BACKGROUND WELL WERE INFLUENCED BY BACKFLOW CAUSED BY FLOOD STAGES. THERE COULD BE SOME BACKFLOW, BUT IT WOULD BE A LOCALIZED EFFECT SO WHEN CONDITIONS RETURNED TO NORMAL, THE FLOOD WATERS WOULD RETURN TO THE WOLF RIVER AND NOT AFFECT PROPERTY VERY FAR BACK ON EACH BANK.

COMMENT: A LOCAL CITIZEN QUESTIONED IF THE ELEVATED LEVELS OF CHLORDANE FOUND IN BACKGROUND WELLS LOCATED ON BIRCH STREET ORIGINATED FROM THE SITE OR OTHER SOURCES.

RESPONSE: IT APPARENTLY ORIGINATED FROM OTHER SOURCES; FLOOD BACKFLOW FROM THE WOLF RIVER WOULD NOT REACH THOSE WELLS.

COMMENT: A LOCAL CITIZEN ASKED IF EPA HAD CONDUCTED ANY STUDIES TO DETERMINE IF CONTAMINATION EXISTED IN THE NEIGHBORHOODS ADJACENT TO THE SITE AND ROADWAYS LEADING TO THE SITE.

RESPONSE: IN THE EARLY 1980'S, JOHNS HOPKINS UNIVERSITY CONDUCTED A PRELIMINARY HEALTH STUDY IN THE COMMUNITY. AROUND 1982, THE CENTERS FOR DISEASE CONTROL STARTED WORKING OFFICIALLY WITH EPA TO DEAL WITH HEALTH ISSUES RELATING TO SUPERFUND. OFFSITE CONTAMINATION WAS FOUND IN THE NEIGHBORHOOD. ONE HUNDRED AND NINETY FOUR PEOPLE IN THE HOLLYWOOD AREA WERE STUDIED. RESULTS FROM THESE STUDIES DID NOT INDICATE ELEVATED LEVELS OF CONTAMINANTS THAT COULD BE ATTRIBUTED TO THE SITE. ELEVATED LEVELS OF PESTICIDES, NOT ASSOCIATED WITH THE SITE, WERE FOUND IN PEOPLE WHO CONSUMED FISH FROM OXBOW LAKE, THE DREDGE LAKE AND THE WOLF RIVER. NO ADVERSE HEALTH EFFECTS WERE FOUND IN THE PEOPLE STUDIED.

COMMENT: A LOCAL RESIDENT QUESTIONED WHEN THE REMEDIAL ALTERNATIVE PROGRAM WOULD START.

RESPONSE: A TYPICAL SUPERFUND SITE REQUIRES APPROXIMATELY ONE YEAR TO COMPLETE CONSTRUCTION. ACTUAL PHYSICAL CONSTRUCTION WOULD NOT BEGIN UNTIL THE DESIGN WORK WAS COMPLETED, APPROVED, SIGNED OFF, AND A CONTRACT WAS RELEASED FOR BIDS EITHER BY EPA OR THE PRPS. ACTUAL CONSTRUCTION WOULD PROBABLY NOT START UNTIL APPROXIMATELY 1 1/2 YEARS.

COMMENT: A LOCAL RESIDENT QUESTIONED IF THE CONTRACTOR'S WORK HAD TO MEET ALL APPLICABLE EPA CLEANUP STANDARDS.

RESPONSE: THE CONTRACTOR HAD TO COMPLY WITH EPA'S CLEANUP STANDARDS NO MATTER IF EPA OR THE CITY OF MEMPHIS LETS THE CONTRACT. THE CORPS OF ENGINEERS WOULD MOST LIKELY OVERSEE THE CONTRACTOR'S WORK TO ENSURE COMPLIANCE.

COMMENT: A LOCAL RESIDENT QUESTIONED HOW MUCH THE SITE REMEDIATION WOULD COST AND WHO WOULD PAY FOR THE REMEDIATION.

RESPONSE: THE TOTAL COST, NOT INCLUDING A CONTINGENCY. WAS ESTIMATED AT 8 MILLION DOLLARS. IF THE PRPS DID NOT MAKE A GOOD FAITH OFFER TO PAY FOR THE REMEDIATION. THEN EPA WILL SPEND PUBLIC MONIES TO IMPLEMENT THE REMEDY.

COMMENT: A LOCAL RESIDENT QUESTIONED IF THE PRPS WOULD BE WILLING TO PAY FOR THE SITE REMEDIATION.

RESPONSE: EPA ANTICIPATED THAT THE PRPS WOULD COME FORTH WITH A GOOD FAITH OFFER BUT WOULD NOT KNOW UNTIL NEGOTIATIONS WERE CONDUCTED.

COMMENT: A LOCAL RESIDENT QUESTIONED WHAT THE COST WOULD BE TO REVITALIZE THE DUMP TO THE EXTENT THAT IT WOULD BE COMMERCIALLY USEFUL PROPERTY.

RESPONSE: THIS WAS DISCUSSED AND CONCLUDED THAT TO REVITALIZE THE DUMP INTO COMMERCIALLY USEFUL PROPERTY WAS NOT TECHNICALLY FEASIBLE FOR A SITE OF THIS SIZE. A COMMERCIAL INCINERATOR WOULD HAVE TO BE BROUGHT ONSITE TO INCINERATE ALL THE WASTE AND THEN STABILIZE OR SOLIDIFY THE ASH FOR BURIAL IN A RCRA-PERMITTED LANDFILL.

COMMENT: A LOCAL RESIDENT QUESTIONED WHO OWNED THE SITE PROPERTY.

RESPONSE: THE SITE WAS PRIVATE PROPERTY. EPA HAD CONDUCTED A FILE SEARCH ON THE PROPERTY AND THE PROPERTY OWNERS.

COMMENT: A LOCAL RESIDENT QUESTIONED IF EPA HAD A LIST OF PRPS, WHO THE PRPS WERE AND IF HE COULD OBTAIN A COPY OF THE LIST.

RESPONSE: EPA HAS A LIST OF PRPS WHICH IS A CONTINUOUSLY EVOLVING LIST. TO OBTAIN A COPY OF THE LIST, AN INDIVIDUAL WOULD HAVE TO SUBMIT A FREEDOM OF INFORMATION ACT (FOIA) REQUEST TO OBTAIN THE LIST. EPA EXPLAINED THAT PARTIES INCLUDED ON THE LIST WERE POTENTIALLY RESPONSIBLE AND NOT NECESSARILY THE ACTUAL RESPONSIBLE PARTIES. THEREFORE, THE LIST IS SUBJECT TO ADDITIONS OR DELETIONS AT ANY POINT IN TIME.

COMMENT: A LOCAL RESIDENT QUESTIONED HOW MUCH INPUT THE PRPS HAD IN SELECTING THE CLEANUP REMEDY AND EXPRESSED CONCERN THAT THE PRPS WOULD SELECT THE LEAST EXPENSIVE ALTERNATIVE.

RESPONSE: EPA, NOT THE PRPS, SELECTED ALL ALTERNATIVES FOR ANY SITE. THE CLEANUP PLAN WAS NON-NEGOTIABLE; IT WAS AN INDEPENDENT EPA (FEDERAL) AND STATE DECISION.

COMMENT: A LOCAL RESIDENT QUESTIONED IF A LOCAL ORGANIZATION COULD OBTAIN A TECHNICAL ASSISTANCE GRANT (TAG).

RESPONSE: YES; IF THE GROUP WAS THE ONLY LOCAL GROUP APPLYING FOR THE TAG AND MET EPA'S REQUIREMENTS.

IV. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA'S RESPONSE TO THESE COMMENTS

THIS SECTION CONTAINS COPIES OF THE FIVE LETTERS RECEIVED BY EPA CONTAINING WRITTEN COMMENTS. EACH LETTER IS FOLLOWED BY A COPY OF EPA'S WRITTEN RESPONSE TO THE LETTER.

#TA

TABLE 10

FIRST QUARTER WATER SAMPLE ANALYTICAL RESULTS (MG/L)(1)

	OXBOW LAKE NHOB-1	BEAVER POND NHBP1	ABANDONED DREDGE POND NHADP-1	NHADP-1 (SPLIT)
BARIUM	0.130	0.094	0.068	NR{2}
CHROMIUM	ND{3}	ND	ND	NR
SRONTIUM	0.120	0.080	0.082	NR
TITANIUM	0.033	0.063	0.013	NR
VANADIUM	ND	0.010	ND	NR
ZINC	0.013	0.130	0.017	NR
ALUMINUM	1.300	2.500	0.400	NR
MANGANESE	0.440	0.120	ND	NR
CALCIUM	26	22	19	NR
MAGNESIUM	9.7	9.9	10	NR
IRON	1.5	2.1	0.3	NR
SODIUM	15	17	16	NR
CYANIDE	0.002K{4}	0.002K	0.002K	0.002K

NOTES:

{1} THIS DATA WAS OBTAINED FROM TAG 1983 STUDIES AND HAS NOT BEEN VERIFIED OR REVIEWED FOR QUALITY ASSURANCE.

{2} NR - NOT REPORTED

{3} ND - NOT DETECTED

{4} K - ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN

TABLE 15
APPROPRIATE STANDARDS AND CRITERIA FOR HUMAN HEALTH

CHEMICAL	TOXICOLOGICAL (1) CLASS	REPRESENTATIVE (8) CONCENTRATIONS IN GROUNDWATER QUALITY (UG/L)	WATER (2) QUALITY CRITERIA (UG/L)	AQUATIC CRITERIA 1/10TH LC50(6)	AQUATIC CRITERIA EPA (3) (UG/L)
INORGANICS					
ARSENIC	PC	20.88	0.025	310	190
BARIUM	NC	396	1,000	40,000	1,400 (5)
COPPER	NC	30	1,000	300	5.6 (5)
LEAD	NC	55	50	140	3.8 (5)
NICKEL	NC	26	15.4	400	96 (5)
VANADIUM	NC	42	NA (4)	480	NA
ZINC	NC	124	5,000	190	320 (5)
CHROMIUM	NC	58	50	500	0.29 (9)
ORGANICS					
ALDRIN	PC	0.34	7.9X(10-3), 7.9X(10-4), 7.9X(10-5)	1.8	1.9X10(-3)
TOTAL BHC	PC	3.78	3.1; 0.31; 0.031 (10)	6.4	0.08(7)
CHLORDANE	PC	1.7	4.8X(10-2); 4.8X(10-3); 4.8X(10-4)	4.1	4.3X10(-3)
4,4'-DDT	PC	0.54	2.4X(10-3); 2.4X(10-4); 2.4X(10-5)	1.1	1.0X10(-3)
DIELDRIN	PC	0.4	7.1X(10-3); 7.6X(10-10); 7.6X(10-5)	0.8	1.9X10(-3)
HEPTACHLOR	PC	0.88	2.9X(10-2); 2.9X(10-3); 2.9X(10-4)	19	3.8X10(-3)
HEPTACHLOR-EXPOXIDE	PC	0.76	N/A(4)	4	NA

NOTES:

(1) NC - NON-CARCINOGEN
PC - POTENTIAL CARCINOGEN

(2) CRITERIA REFLECT EPA WATER QUALITY CRITERIA (WQC) CONCENTRATIONS (UNLESS OTHERWISE NOTED). WQC FOR POTENTIAL CARCINOGENS ARE PRESENTED AS THE THREE CONCENTRATIONS THAT REPRESENT (10-4), (10-5), AND (10-6) ADDITIONAL RISK OF CANCER FOR CONSUMPTION OF FISH ONLY.

(3) FRESHWATER CHRONIC EXPOSURE CRITERIA (EPA) FOR 24-HOUR PERIOD UNLESS OTHERWISE NOTED. (FR. VOL. 45, NO. 231, NOV. 28, 1980; 79318-79341).

(4) NA - NO CRITERIA ESTABLISHED ON THIS CHEMICAL.

(5) WATER HARDNESS - 100 MG/L

(6) 1/10 96 HOUR LC50. (LC50 VALUE FOR ORGANIC CHEMICALS IN WARM WATER SPECIES LISTED IN HANDBOOK OF ENVIRONMENTAL DATA ON ORGANIC CHEMICALS, KAREL VERSCHUEREN, VAN NORSTRAND RHERSHOLD CO. NEW YORK). INORGANIC LC50 INFORMATION FROM WATER QUALITY CRITERIA, CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, J.E. MCKEE, H.W. WOLF, EDITORS, 2ND EDITION 1963.

(7) PRESENTED FOR GAMMA-BHC (LINDANE)

(8) REPRESENTATIVE CONCENTRATION IS AVERAGE OF ALL POSITIVE DETECTS.

(9) CHROMIUM PRESENTED AS WORST CASE FOR HEXAVALENT CHROMIUM.

(10) PRESENTED FOR ALPHA-BHC.

TABLE 24

ALLOWABLE CONTAMINANT LEVELS IN FISH TISSUE

(USING A (10-6) RISK LEVEL FOR A 70 KG ADULT CONSUMING 6.5 GRAMS OF FISH PER DAY)

CONTAMINANT	ALLOWABLE CONTAMINANT LEVEL (MG/KG)
CHLORODANE	8.3 X (10-3)
CHLORODENE	8.3 X (10-3)
HEPTACHLOR	2.4 X (10-3)
HEPTACHLOR EPOXIDE	2.4 X (10-3)
ALDRIN	6.54 X (10-4)
DIELDRIN	6.7 X (10-4)
TOTAL BHC	2.0 X (10-2)
4,4' DDT	3.2 X (10-2)
ENDRIN	3.2
ARSENIC	6.2 X (10-3)
BARIUM	538
NICKEL	215
LEAD	1.5
COPPER	398
ZINC	2154
VANADIUM	75

TABLE 5

SUMMARY OF ANALYTICAL DATA
WOLF RIVER WATER SAMPLES (ROUND 1)

SAMPLE LOCATIONS (SEE FIGURE 5)

COMPOUND DETECTED	WR1 MIDWAY PAST DUMP	WR2 UPSTREAM EDGE OF DUMP	WR3 DOWNSTREAM	WR4 UPSTREAM
A. VOLATILE ORGANICS				
CHLOROMETHANE	ND	ND	ND	12.30
CHLOROETHANE	ND	ND	ND	7.33
ACETONE (1)	ND	ND	ND	42.50
1,1-DICHLOROETHANE	ND	ND	ND	7.18
TRANS-1,2-DICHLOROETHENE	ND	ND	ND	10.80
CARBON TETRACHLORIDE	ND	ND	ND	3.10
BENZENE	ND	ND	ND	6.52
TRICHLOROETHENE	ND	ND	ND	8.43
BROMODICHLOROMETHANE	ND	ND	ND	19.40
TOLUENE	ND	ND	ND	68.40
TETRACHLOROETHENE	ND	ND	ND	6.69
CHLOROBENZENE	ND	ND	ND	19.20
ETHYL BENZENE	ND	ND	ND	28.40
1,1-DICHLOROETHANE	ND	ND	ND	21.20
B. BASE NEUTRAL/ACID EXTRACTABLES (2)				
C. PESTICIDES (3)				
D. METALS (4)				
COPPER	0.024	ND	ND	ND
BARIUM	0.024	0.025	0.023	0.029
STRONTIUM	0.023	0.024	0.026	0.027
ALUMINUM	0.260	0.376	0.200	0.310
ZINC	0.004	0.007	0.005	ND

NOTES:
1) QA/QC EVALUATION CONCLUDED THAT POSITIVE DETECTIONS ARE DUE TO LABORATORY CONTAMINATION
2) NO BASE NEUTRAL/ACID EXTRACTABLES WERE DETECTED IN THE FOUR SAMPLES ANALYZED
3) PESTICIDE DATA NOT USED FROM ROUND 1 DUE TO LACK OF CONFIRMATION AND ELEVATED CONCENTRATIONS IN BLANKS
4) RANGE OF POSITIVE DETECTIONS FOR METALS SHOWN ARE MG/L